

KMN

(PAZTAL LAM)

T-583.05

SECTION 2. INSTALLATION

2.1 UNPACKING

Remove the TS-830S from its shipping container and packing material and examine it for visible damage. If the equipment has been damaged in shipment, notify the transportation company immediately. Save the boxes and packing material for future shipping or moving.

The following accessories should be included with the transceiver.

- | | |
|--|---|
| 1. Instruction Manual (B50-2738-00) | 1 |
| 2. Plastic Extension Feet with Screws
(J02-0049-14) | 2 |
| 3. Speaker Plug 1/8" (E12-0001-05) | 1 |
| 4. 7P DIN Plug (E07-0751-05) | 1 |
| 5. Fuse (6A) (F05-6021-05) | 1 |

2.2 OPERATING LOCATION

As with any solid state electronic equipment, the TS-830S should be kept from extremes of heat and humidity. Choose an operating location that is dry and cool, and avoid operating the transceiver in direct sunlight. Also, allow at least 3 inches clearance between the back of the equipment to any object. This space allows an adequate air flow from the ventilating fan to keep the transceiver cool.

CAUTION:

Do not operate the radio in an RF Field greater than 6V RF. Receiver damage may occur.

2.3 CABLING (See Figure 2-1.)

■ GROUND

To prevent electric shock, and reduce the possibility of TVI and BCI, connect the transceiver to a good earth ground, through as short a lead as possible. Use ground rods or metal cold water feedline.

■ ANTENNA

Connect through a 50 ohm antenna feedline to the coaxial connector on the rear panel.

■ KEY

If CW operation is desired, connect a key to the KEY jack. Use shielded line or coaxial cable.

■ POWER CONNECTIONS

Make sure the POWER switch on the front panel is turned off, the stand-by switch is in the REC position, and the line voltage is correct. Then connect the POWER cord to the line source.

■ AC POWER

For fixed station operation, the TS-830S operates from 120 VAC, 50/60 Hz power source capable of supplying 280 watts or more.

2.4 MICROPHONE

Attach the microphone connector to a suitable microphone, as shown in Figure 2-1. Be sure the microphone PTT switch is separate from the microphone circuit, as shown in Figure 2-3.

It should be noted that a microphone with a 3P plug using a common ground terminal should not be used.

The microphone input is designed for 50 kohm microphones. The choice of microphone is important for good speech quality, and should be given serious consideration. The crystal lattice filter in the transceiver provides all the restriction necessary on audio response, and further restriction in the microphone is not required. It is more important to have a microphone with a smooth, flat response throughout the speech range.

Follow the microphone manufacturer's instructions for connecting the microphone cable to the plug. With many microphones, the push-to-talk button must be pressed to make microphone audio available. For VOX operation, this unwanted feature may be eliminated, if desired, by opening the microphone case and permanently connecting the contacts which control the microphone audio.

Standard microphone sensitivity is within the range of -50 dB to -60 dB. If a microphone having a higher sensitivity is used, the ALC and compressor circuits will not function properly. In this case, insert in the mike line an attenuator as shown in Fig. 2-1. A typical MIC gain control setting is 12 o'clock. If you must run this control at 9 o'clock or less, use an attenuator.

2.5 KEY

If CW operation is desired, connect a key to the KEY jack. Use shielded cable, and a standard (mono or 2P) phone plug.

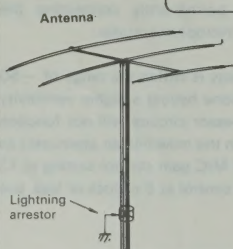
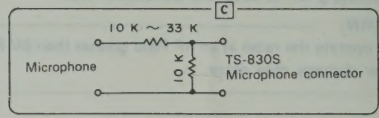
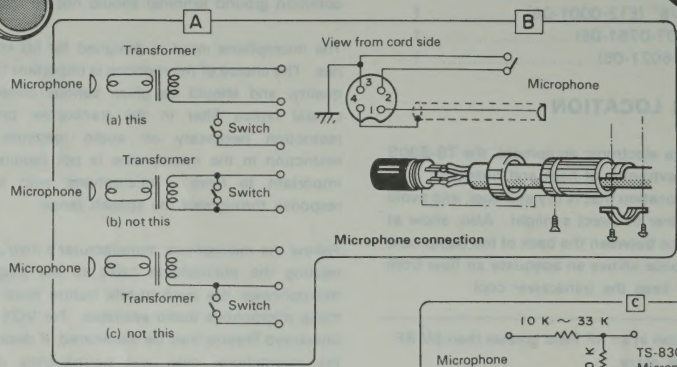
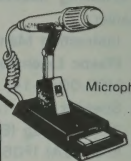
Headphones

Use headphones of 4 to 16Ω impedance. The optional HS-4, HS-5 headphones best suited for use with the TS-830S. Stereo-type set phones can also be used.

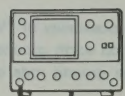


Microphone

Either a low or high impedance microphone (500Ω to 50 kΩ) can be used. The P.T.T. switch should be isolated from the mic circuit (shown in "A"). Use a microphone with a separate switch and MIC line so both P.T.T. and VOX are available.



Key
For CW operation, connect your key to the KEY jack at the rear. Use shielded cable.



Monitor scope SM-220
Can be used as a band scope or a monitor scope.

External speaker
Besides the built-in speaker, an external speaker can also be used. Connect to the rear EXT SP jack using the supplied plug.

GND terminal
It is recommended that a ground lead be connected to the GND terminal at the rear of the set to prevent the possibility of electric shock, TVI and BCI. Use as short, and heavy a lead as possible.

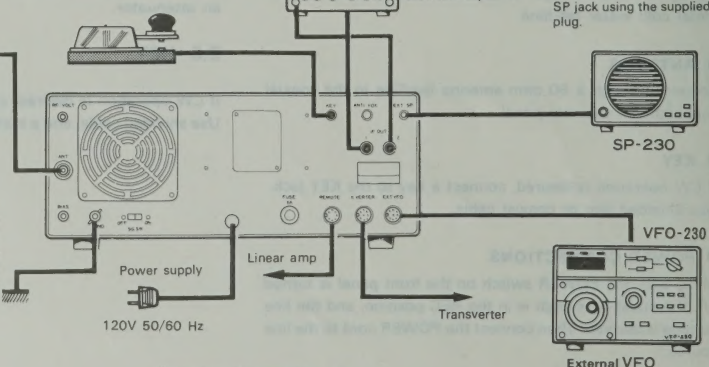


Fig. 2-1 Connection

2.6 EXTERNAL SPEAKER AND HEADPHONES

Receive audio output from the TS-830S is 1.5 watts at 4 to 16 ohms. The TS-830S has a built-in the SPEAKER jack on the rear panel. The speaker may be an 8-ohm permanent-magnet type, 4 inches or larger. The internal speaker is disconnected when an external speaker is used. Headphones should also be 4 to 16 ohms impedance. When the headphones are connected to the front-panel PHONES jack, the speaker is disabled.

2.7 GROUND

To prevent electric shock, and reduce the possibility of TVI and BCI, connect the transceiver to a good earth ground through as short and heavy a lead as possible.

2.8 ANTENNA

Any of the common antenna systems designed for use on the high frequency amateur bands may be used with the TS-830S, provided the input impedance of the transmission line is not outside the capability of the pi-output matching network. The transmission line should be coaxial cable. An antenna system which shows a standing wave ratio of less than 2:1 when using 50 or 75 ohm coaxial transmission line, or a system that results in a transmission line input impedance that is essentially resistive, and between 15 and 200 ohms will take power from the transceiver with little difficulty. If openwire or balanced type transmission line is used with the antenna, a suitable antenna tuner with balun is recommended between the transceiver and the feed line. Methods of construction and operating such tuners are described in detail in the ARRL Antenna Handbook, and similar publications. For operation on the 160, 75 and 40 meter bands, a simple dipole antenna, cut to resonance in the most used portion of the bands, will perform satisfactorily. For operation of the transceiver on the 10, 15 and 20 meter bands, the efficiency of the station will be greatly increased if a good directional rotary antenna is used. Remember that even the most powerful transceiver is useless without a proper antenna.

NOTE:

Protect your Equipment — Use a LIGHTING ARRESTOR.

Mobile Station — Mobile antenna installations are critical, since any mobile antenna for use on the high frequency bands represents a number of compromises. Many amateurs lose the efficiency of their antenna through improper tuning. Remember the following points when using the TS-830S with a mobile antenna.

The "Q" of the antenna loading coil should be as high as possible.

The loading coil must be capable of handling the power of the transceiver without overheating. In the CW mode the power output of the transceiver will exceed 80 watts.

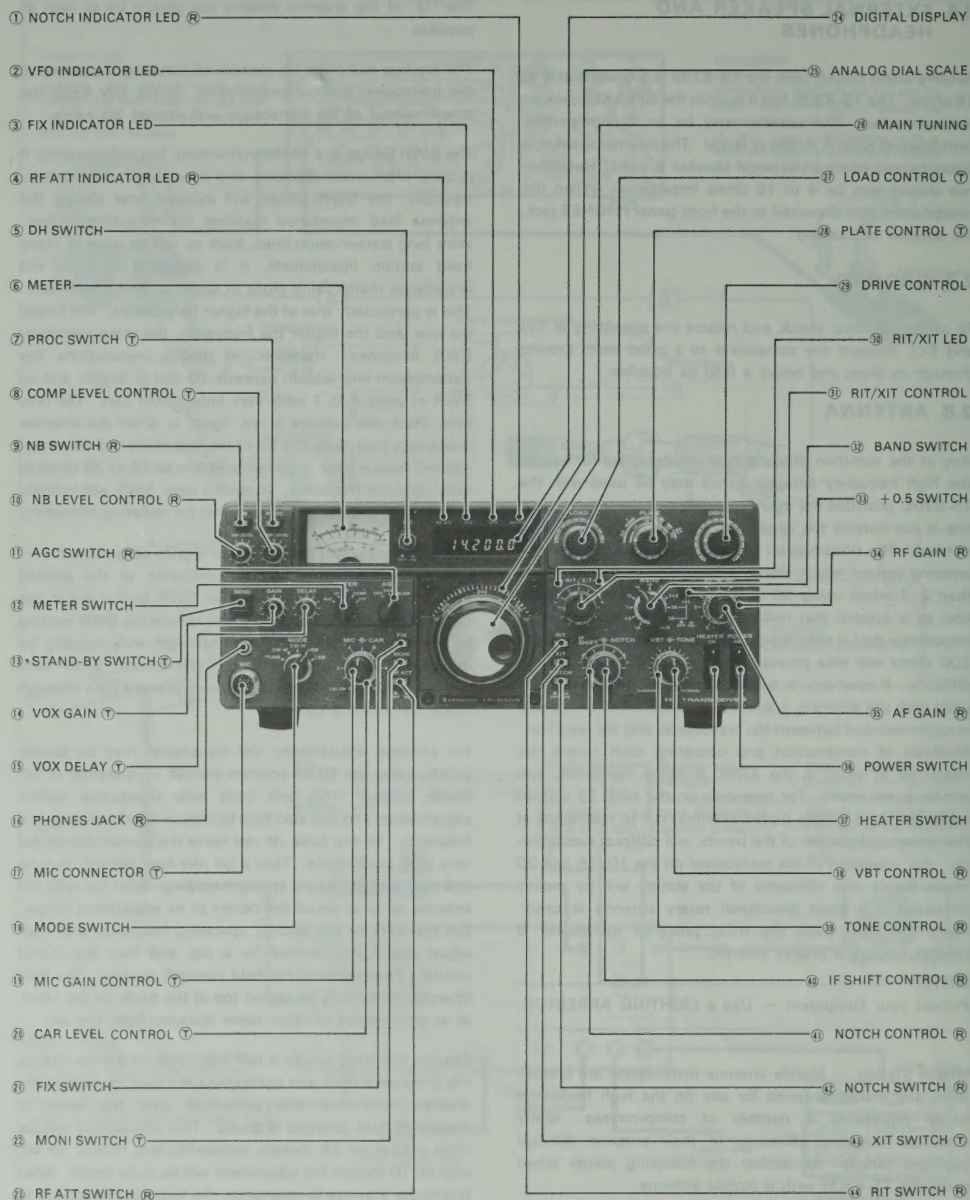
The SWR bridge is a useful instrument, but unfortunately it is quite often misunderstood, and overrated in importance. Basically, the SWR bridge will indicate how closely the antenna load impedance matches the transmission line. With long transmission lines, such as will be used in many fixed station installations, it is desirable to keep the impedance match fairly close in order to limit power loss. This is particularly true at the higher frequencies. The longer the line, and the higher the frequency, the more important SWR becomes. However, in mobile installations the transmission line seldom exceeds 20 feet in length, and an SWR of even 4 to 1 adds very little power loss. The only time SWR will indicate a low figure is when the antenna presents a load close to the 50 ohms, but many mobile antennas will have a base impedance as low as 15 or 20 ohms at their resonant frequency. In such a case, SWR will indicate 3 or 4 to 1, and yet the system will be radiating efficiently.

The really important factor in your mobile antenna is that it should be carefully tuned to resonance at the desired frequency. The fallacy in using an SWR bridge lies in the fact that it is sometimes possible to reduce the SWR reading by detuning the antenna. Field strength may actually be reduced in an effort to bring SWR down. Since field strength is the primary goal, we recommend a field strength meter for antenna tuning.

For antenna adjustments, the transceiver may be loaded lightly, using the TUNE position instead of operating at full power output. This will limit tube dissipation during adjustments, and will also help to reduce interference on the frequency. In any case, do not leave the transmitter on for very long at one time. Turn it on just long enough to tune and load, and get a field strength reading. Start out with the antenna whip at about the center of its adjustment range. Set the VFO to the desired operating frequency and then adjust the PLATE control for a dip, and then the LOAD control. Then observe the field strength reading. The field strength meter may be set on top of the dash, on the hood, or at an elevated location some distance from the car.

Change the whip length a half inch or so at a time, retune the finals each time, and again check the field strength at the antenna. Continue this procedure until the point of maximum field strength is found. This adjustment will be most critical on 75 meters, somewhat less critical on 40, until on 10 meters the adjustment will be quite broad. After tuning the antenna to resonance, the finals can be loaded to full power.

SECTION 3. CONTROLS AND THEIR FUCTIONS



3.1 FRONT PANEL

The symbol after the part name indicates:

Ⓡ: Active only during reception.

Ⓣ: Active only during transmission

No symbol: Always active

1. NOTCH INDICATOR LED Ⓡ

This indicator, (light emitting diode), illuminates when the NOTCH circuit is turned ON.

2. VFO INDICATOR LED

The VFO indicator illuminates when the internal VFO controls transceiver operation. The indicator is not lighted during fixed channel or remote VFO operation.

3. FIX (FIXED CHANNEL) INDICATOR LED

The FIX indicator illuminates when the internal fixed frequency oscillator controls transceiver operation.

4. RF ATT INDICATOR LED Ⓡ

This illuminates when the RF ATT is turned ON.

5. DH (DISPLAY HOLD) SWITCH

With this switch ON, the display frequency remains ON even if the main tuning is changed. This feature is used to memorize the original frequency when checking another frequency.

6. METER

The meter monitors six different functions, depending on METER switch position. In receive the meter is automatically an S-meter, and shows received signal strength on a scale of 0 to 40 dB over S9. In transmit, meter function depends on the position of the METER switch, as described below. This is an average-responding meter, NOT peak-reading.

7. PROC (SPEECH PROCESSOR) SWITCH Ⓣ

This switch is used during SSB operation. Set the switch to the ON position and the speech processor will be activated, increasing the average talk power. Compression level can be adjusted by the processor control (8).

8. COMP LEVEL CONTROL Ⓣ

This control adjusts compression level. Set the meter switch (12) to the COMP position and adjust this control while observing the meter COMP scale.

9. NB SWITCH Ⓡ

With the lever switch UP, the noise blanker circuit is turned ON reducing pulse-type (ignition) noise. Power-line, radar, QRM and atmospheric "white" noises will not operate the blanker. The noise blanker circuit operating level is adjustable by the noise blanker control (10).

10. NB LEVEL CONTROL Ⓡ

This control adjust the noise blanker circuit (operating level) according to receiving conditions or noise level.

11. AGC SWITCH Ⓡ

This controls the AGC (Automatic Gain Control) circuit:

OFF..... AGC disabled (no AGC).

FAST..... Normally used for CW operation.

SLOW..... Normally used for SSB operation.

12. METER SWITCH

This determines the transmit meter function:

ALC (Automatic Level Control)

Monitors internal ALC voltage, or the ALC voltage feedback from a linear amplifier operated in conjunction with the TS-830S. For SSB operation the ALC reading for voice peaks should be within the indicated ALC range. ALC voltage adjustment is made with the MIC control for SSB and with the CAR control for CW.

IP (Plate Current)

In this position the meter monitors final tube plate current. The scale is calibrated from 0 to 350 ma.

RF (Output Power)

This monitors relative output power of the transceiver. There is no meter scale for this position. Normally the reading should be adjusted (with the RF VOLT control) for a 2/3 scale reading.

COMP

This indicates compression level when the speech processor is operating.

HV (High Voltage)

This position monitors the high voltage power supply. The meter scale is calibrated from 0 to 10, indicating 0 to 1000 volts.

13. STAND-BY SWITCH Ⓣ

This two-position lever switch selects:

REC The transceiver is receiving unless the microphone PTT switch, or the VOX circuit is activated.

SEND Locks the unit in transmit.

14. VOX GAIN ①

This controls sensitivity of the VOX (Voice Operated Transmit) circuit.

15. VOX DELAY CONTROL ①

The DELAY control adjusts the hold time for VOX or break-in CW operation. Adjust for individual preference.

16. PHONES JACK ②

The headphones jack allows use of a 4 to 16 ohm headphone through a 1/4" phone plug. When phones are used the speaker is disconnected.

17. MIC CONNECTOR ①

The four pin connector allows use of a PTT microphone. Figure 2-1B shows plug wiring.

18. MODE SWITCH

The mode switch selects type of emission; and TUNE.

TUNE This position provides reduced carrier and shorted key line for transceiver tuning. (Input power to the final section is reduced to prevent tube damage during tune-up.)

CW.W Used for CW operation. A high-cut filter is inserted in the receiver audio circuit to reduce unwanted noise. SSB filter selected for WIDE receive bandwidth.

CW.N (NARROW) Used for CW operation with CW filters YK-88C (500 Hz), YK-88CN (270 Hz), YG-455C (500 Hz) or YG-455CN (250 Hz), which are available as optional accessories. Without an optional CW filter installed, the pass-bandwidth is the same as in CW.W.

USB Used for upper-sideband operation. International Amateur practice dictates the use of USB on the 10, 14, 18, 21, 24.5 and 28 MHz bands.

LSB Selects lower-sideband. International Amateur practice dictates the use of LSB on the 1.8, 3.5 and 7 MHz bands.

19. MIC GAIN CONTROL ①

This control adjusts microphone amplifier gain for SSB operation. Adjust for an on-scale ALC reading on voice peaks.

In the CAL ON position, receive frequency can be calibrated at 25 kHz intervals using the built-in oscillator.

20. CAR LEVEL CONTROL ①

This controls carrier level during CW operation. Adjust for approximately 250 mA of plate current.

21. FIX SWITCH

Place this switch ON for fixed channel operation; (an optional crystal is required. Trio-Kenwood does not supply these crystals.)

22. MONI (MONITOR) SWITCH ①

This delivers a sample of the demodulated transmit IF signal to the AF for monitoring modulation.

23. RF ATT SWITCH ②

With this switch ON, A 20 dB attenuator is inserted in the antenna circuit, protecting the RF amplifier and mixer from overload on strong input signals.

24. DIGITAL DISPLAY

The digital display indicates operating frequency to the nearest 100 Hz.

25. ANALOG DIAL SCALE

The mono-scale permits direct analog frequency readout over the 0 to 500 kHz range, graduated at 1-kHz intervals. Operating frequency equals the dial (in kHz) plus the BAND switch frequency (in MHz). An additional 50 kHz both above and below the 500 kHz range is also covered.

26. MAIN TUNING

This controls the VFO, selecting the transceiver's operating frequency. The indented knob is convenient for quick tuning.

27. LOAD CONTROL ①

This controls the loading of the network between the final section and the antenna. Adjustment is described in Section 4.

28. PLATE CONTROL ①

This controls the plate tuning of the final amplifiers. Calibration is approximate.

29. DRIVE CONTROL

This control tunes the plate tank circuit of the 12BY7A driver as well as the receiver's antenna and mixer coils. In receive the DRIVE control is tuned for maximum sensitivity (maximum S-meter deflection), and in transmit for a maximum ON-SCALE ALC reading. These points occur concurrently. Tuning for one also achieves the other.

30. RIT/XIT INDICATOR LED

This indicator will light when the RIT switch (44) or XIT switch (43) is ON.

31. RIT/XIT CONTROL

This control allows the receive frequency, transmit frequency or both to be shifted without using the main tuning control. With the RIT switch (44) ON, the RIT circuit is activated to shift only the receive frequency.

With the XIT switch (43) ON, the XIT circuit is activated to shift only the transmit frequency.

When both switches are ON, both frequencies are shifted. The center (O) position equals no shift.

32. BAND SWITCH

The 10-position switch selects all Amateur bands from 1.8 to 29.7 MHz. To select the 28.5 or 29.5 MHz bands, push the +0.5 switch (33) ON.

Use the 10 MHz band for WWV reception. An AUX receive band is also available.

Coilpack (Receiver front-end) and PLL components must be installed and aligned for the specific receive frequency range desired.

33. +0.5 SWITCH

This switch is used in conjunction with the bandswitch (32.). Depress the switch with the bandswitch set to "28", and the transceiver will operate in the 28.5 MHz band. When the bandswitch is set to "29", the transceiver will operate in the 29.5 MHz band. This switch has no function at any other bandswitch position.

34. RF GAIN $\text{\textcircled{R}}$

This adjusts receiver RF amplifier gain. Turn fully clockwise for maximum gain and a correct S-meter reading.

35. AF GAIN $\text{\textcircled{R}}$

This adjusts receiver audio level. Volume increases clockwise.

36. POWER SWITCH

This switches all power to the transceiver.

37. HEATER SWITCH

This switch turns the three transmitting tube filaments ON.

38. VBT CONTROL $\text{\textcircled{R}}$

The VBT (Variable Bandwidth Tuning) continuously adjusts the IF Filter bandwidth to eliminate radio interference. For normal operation, this control may be left fully clockwise (NORMAL Position).

39. TONE CONTROL $\text{\textcircled{R}}$

This adjusts audio tone quality of received signals. Adjust as desired.

40. IF SHIFT CONTROL $\text{\textcircled{R}}$

During reception, the center frequency of the IF crystal filter can be shifted ± 1.2 kHz facilitating adjustment of tone quality, or eliminating interference from nearby frequencies. For normal operation, set to the center detent position (click stop).

41. NOTCH CONTROL $\text{\textcircled{R}}$

Turn the NOTCH switch ON to activate the Notch filter. Adjust the notch frequency to null a beat (tone interference) signal.

42. NOTCH SWITCH $\text{\textcircled{R}}$

This switch controls the NOTCH circuit and indicator.

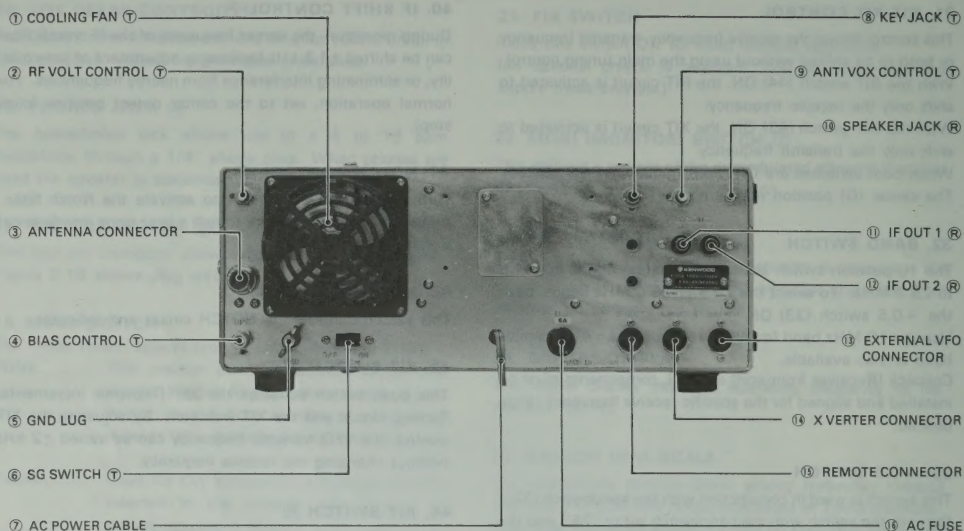
43. XIT SWITCH $\text{\textcircled{T}}$

This push switch activates the XIT (Transmit Incremental Tuning) circuit and the XIT indicator. By adjusting the XIT control, the VFO transmit frequency can be varied ± 2 kHz without changing the receive frequency.

44. RIT SWITCH $\text{\textcircled{R}}$

This push switch activates the RIT (Receiver Incremental Tuning) circuit, and the RIT indicator. By adjusting the RIT control, the VFO receive frequency can be varied ± 2 kHz, without changing the transmit frequency.

If, both switches are ON, both the transmit and receive frequencies will shift simultaneously.



3.2 REAR PANEL

1. COOLING FAN (T)

This fan cools the RF amplifier section to insure reliable and efficient operation.

2. RF VOLT CONTROL (T)

This adjusts the RF output meter reading. Set for 2/3 scale reading during CW transmission.

3. ANTENNA CONNECTOR

This SO-239 coax connector should be attached to a suitable 50Ω antenna for transmitting and receiving.

4. BIAS CONTROL (T)

This adjusts the bias voltage to the (6146B) amplifier tubes. Clockwise rotation increases the idling plate current. Section 4 describes adjustment to 60 ma.

5. GND (GROUND) LUG

To prevent electric shock, as well as RFI and BCI, connect the transceiver to a good earth ground.

6. SG SWITCH (T)

This slide switch controls the screen grid voltage to the final tubes. For neutralizing, switch OFF. The switch remains ON for normal operation.

7. AC POWER CABLE

This cable is used to connect an AC power source to the transceiver.

8. KEY JACK (T)

Using shielded line, connect a key to this 1/4" phone jack for CW operation. Key open-terminal voltage is approximately -65V.

9. ANTI VOX CONTROL ㊦

Adjust the control to prevent speaker output from tripping the VOX.

10. SPEAKER JACK ㊦

The receiver audio output can be connected through this jack to an external 4 to 16 ohm speaker. The internal speaker is disconnected when an external speaker is connected.

11. IF OUT 1 ㊦

A Buffered Mixer output for pan display use. This is a wide-band, low-level IF signal.

12. IF OUT 2 ㊦

A high-level, narrow-band IF output, taken before the RX Produce Detector, for scope display of received signal waveform.

13. EXTERNAL VFO CONNECTOR

This DIN connector is used to interface the KENWOOD VFO230 external VFO. The interconnecting cable is provided with the VFO-230.

PIN	FUNCTION	PIN	FUNCTION
1	VFO signal	5	VFO control
2	Relay control (+ on transmit)	6	Display control
3	+9V	7	Ground
4	CW freq. shift control	8	+12V

14. X VERTER CONNECTOR

This DIN connector is used to interface a VHF transverter.

PIN	FUNCTION	PIN	FUNCTION
1	Ground	5	Transverter input
2	Relay control (+ on transmit)	6	Transverter ALC input
3	Ground	7	Transverter output
4	X-verter ON-OFF control	8	HF ANT output

15. REMOTE CONNECTOR

This connector is used to interconnect a linear amplifier or other accessory item.

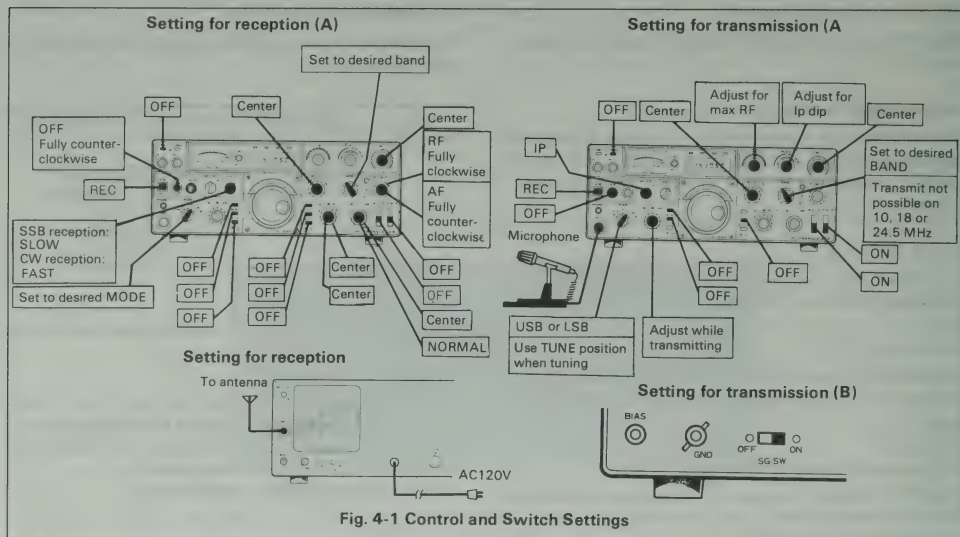
PIN	FUNCTION	PIN	FUNCTION
1	Record output (100~150 mV AF)	5	Normally closed (relay contact)
2	Relay common terminal (NOT grounded)	6	ALC input ALC threshold level approx. -6V
3	PTT line	7	No connection
4	Normally opened (relay contact)		

16. AC FUSE

This fuse protects the transmitter power supply against short circuits. Never use a higher amperage fuse than specified; it will eventually cause extensive damage. If the fuse blows, try to determine the cause before replacing.

For 120 volt operation use a 6 ampere fuse.

SECTION 4. OPERATION



4.1 RECEPTION (I)

NOTE:

Set the MIC and CAR controls to minimum to prevent accidental transmission before tune-up is completed. The TS-830S must be operated into a 50 ohm antenna or dummy load with an SWR less than 2:1. Random length wire antennas or light-bulb dummy loads cannot be used. Conventional half-wave dipoles and beam antennas should only be used at or near their resonant frequency. Exceeding an SWR of 2:1 can damage the output stage of the transceiver.

(1) Basic Procedures for Receive Operation

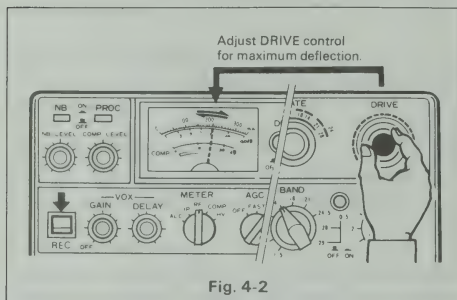
The TS-830S has many advanced features such as VBT, IF SHIFT, NOTCH, etc. to assure enhanced receive operation. For the use of these specialized controls and switches, refer to Section 4.2 "Reception (II)".

With a suitable antenna and microphone or key connected to the transceiver, set the controls as described in Fig. 4-1.

Turn the POWER switch ON. The meter, dial scale, and VFO indicator will light, indicating the transceiver is operating. Advance the AF GAIN control clockwise until some receiver noise is heard in the speaker. Turn the main tuning dial within the frequency range of the Amateur band chosen until a signal is heard. Tune the signal for clearest reception, and then adjust the DRIVE control for maximum S-meter deflection.

(2) WWV Reception

Set the band switch to "10" and turn the main tuning control to 10.0 MHz.



4.2 RECEPTION (II)

This section covers operation of controls and switches to provide the maximum performance from the TS-830S.

(1) RF ATT SWITCH

The input to the receive RF amplifier is attenuated approximately 20 dB, providing distortion-free reception. This feature may be used in cases of receiver overload, caused either by a strong local signal, or during weak signal reception when a strong adjacent signal may blank the receiver.

(2) RF GAIN CONTROL

RF GAIN is controlled by changing the AGC threshold voltage. Adjust the RF GAIN so the S-meter does not deflect excessively. This also reduces noise during reception. For normal operation, this control should be turned fully clockwise for maximum sensitivity.

(3) AGC (AUTOMATIC GAIN CONTROL)

Set the AGC switch to the appropriate position: Generally for SSB, SLOW, for CW FAST, and for very weak signals, the AGC may be turned OFF.

Simultaneous Use of the RF GAIN CONTROL and AGC Switch

If a strong signal (such as a local station) appears in the vicinity of the intended receive signal, the S meter may show unusual deflection due to the AGC voltage developed from the strong disturbing signal. If this occurs, turn the RF GAIN down so the meter pointer remains at about the original deflection peak and turn the AGC switch OFF. This will eliminate the unwanted AGC voltage and permit clear reception.

(4) RIT/XIT

First set the RIT/XIT control to center, and turn the RIT switch ON.

The RIT/XIT control allows shifting the receive frequency by approximately ± 2 kHz without changing the transmit frequency.

With the RIT switch ON, the receive frequency can be adjusted by using the RIT control.

With both the RIT and XIT switches ON, both the transmit and receive frequencies can be shifted.

For XIT switch operation, refer to Section 4.4 "Transmission (II)".

NOTE:

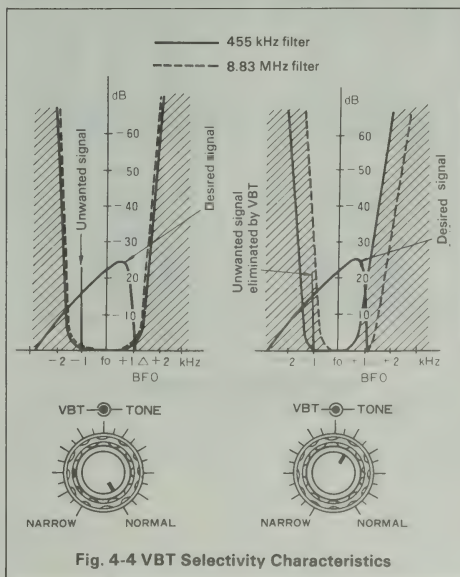
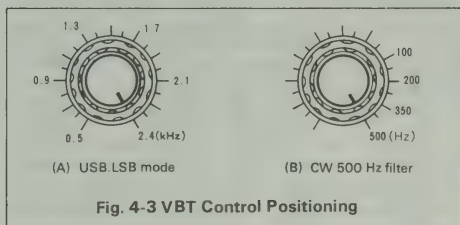
When the RIT is ON, transmit frequency is different from the receive frequency. For normal operation, leave the RIT switch OFF. It should be turned ON only when needed.

(5) VBT CONTROL (Variable Bandwidth Tuning)

This control is used to eliminate radio interference by changing the IF passband-width. Use this control in

conjunction with the IF SHIFT and NOTCH filter to obtain optimum results. By setting the VBT control to the NORMAL position, maximum passband-width is obtained. The IF filter passband-width is narrowed as the control is adjusted counterclockwise, while center frequency remains unchanged. Fig. 4-4 illustrates operation. The range of variability depends on the type of optional filter used.

- (i) When the filter bandwidth is 2.4 kHz (without an optional filter), the passband-width varies within the range of 500 Hz to 2.4 kHz. See Fig. 4-3.
- (ii) With an optional YK-88C filter (8.83 MHz, 500 Hz bandwidth) or YG-455C filter (455 kHz, 500 Hz bandwidth), the passband-width varies from 500 Hz to approximately 150 Hz. Since an optional filter center frequency is 700 Hz higher than that of the built-in 2.4 kHz filter, the CW receive tone will be about 800 Hz without using the IF shift. Fig. 4-4 shows the VBT function with an optional filter.



(6) IF SHIFT

By using the IF SHIFT during reception, the crystal filter passband frequency can be shifted approximately ± 1.2 kHz. This is achieved by use of a PLL (Phase-Locked Loop) in the L.O. (local oscillator) circuit. This is a major feature of the TS-830S and can be used in the following cases:

1. Adjustment of tone quality and interference rejection during SSB Reception.

When the transceiver is on 20 meters and above, USB mode, turn the IF SHIFT in the "+" direction and the lower frequencies are attenuated. Turning the knob in the "-" direction cuts the higher frequencies. (These procedures are reversed for LSB operation below 20 meters). Adjust the control to your listening preference. The IF SHIFT is also effective in eliminating interference from adjacent receive signals.

2. Adjustment of tone quality during CW operation.

For detailed descriptions, refer to Section 4.4 (5) "CW operation".

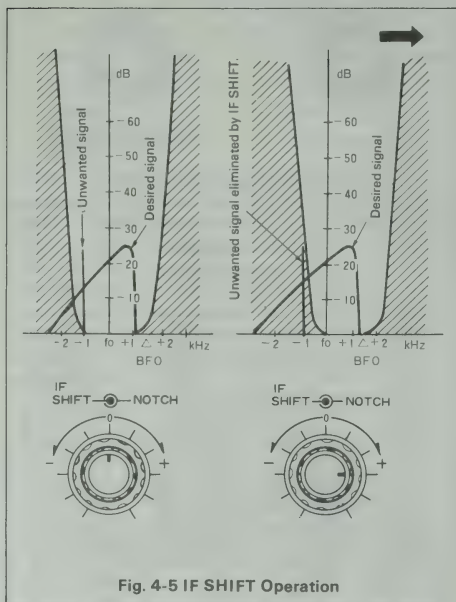


Fig. 4-5 IF SHIFT Operation

(7) VBT AND IF SHIFT COMBINATION

If excessive radio interference is encountered during SSB operation, adjust the VBT for optimum bandwidth, and the IF SHIFT for maximum intelligibility.

In CW mode, first adjust the VBT. Turn the IF SHIFT "-" (counter clockwise), adjusting for approximately 800 Hz tone. If pitch lower than 800 Hz is desired, adjust the RIT and IF SHIFT.

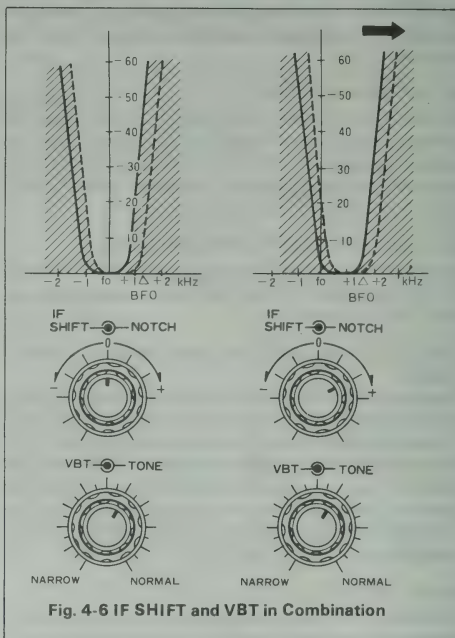


Fig. 4-6 IF SHIFT and VBT in Combination

(8) NOTCH CONTROL

If a single tone such as a CW signal is superimposed on the receive signal, turn the NOTCH ON and adjust the NOTCH control to eliminate or minimize the beat signal. A beat of approximately 1.5 kHz can be eliminated at the center position of the control. In USB or CW mode, a beat signal lower than 1.5 kHz can be eliminated by turning the control clockwise. In LSB mode, adjust the control counterclockwise.

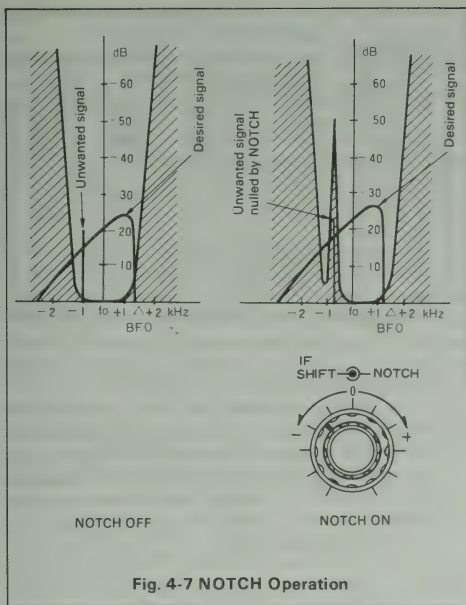


Fig. 4-7 NOTCH Operation

(9) NOISE BLANKER (NB)

For pulse type noise, such as generated by automotive ignition systems, turn the NB switch ON. Adjusting the NB LEVEL control varies the blanker's threshold, eliminating even low level noises.

If high level signal or noise is present on an adjacent frequency, do not use excessive NB threshold LEVEL as it may distort the received signal.

(10) TONE CONTROL

Adjust this control to obtain desired tone quality.

4.3 TRANSMISSION (I)

This section covers adjustment of the transceiver for transmission.

Refer to Fig. 4-1 for initial transmitter switch settings. Set the main tuning to the desired operating frequency. (Refer to Table 4-1 for a summary of the following.)

CAUTION:

DO NOT turn the BANDSWITCH while the transceiver is in transmit mode.

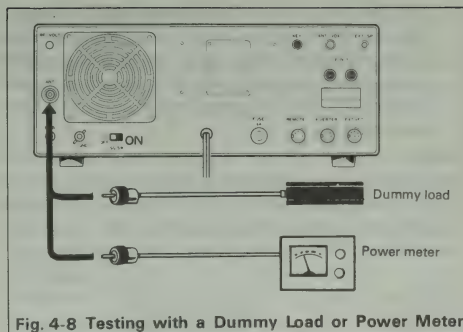


Fig. 4-8 Testing with a Dummy Load or Power Meter

1. Connect a 50 Ω antenna for the band you will operate or a dummy load, and connect a Key. SWR must be 2:1 or better. The life of the final tubes is directly related to the SWR of the antenna, and to the length of tuning periods.
2. Turn POWER and HEATER Switches ON.
3. Place the MODE switch to SSB, METER switch to Ip.
4. Place the STAND-BY switch to SEND and adjust bias to 60 mA with the BIAS control on the rear panel.

CAUTION:

If the plate current is higher than 60 mA do not leave the stand-by switch on for more than a few seconds. Excessive plate current shortens the life of the final tubes.

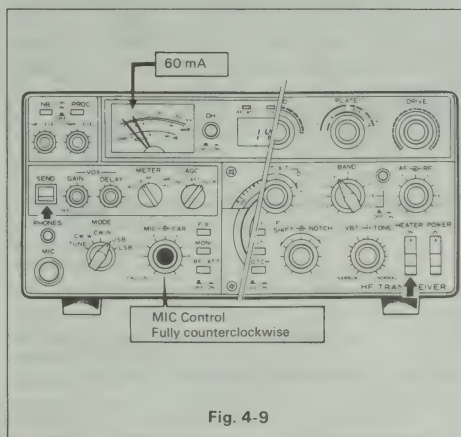


Fig. 4-9

- Place MODE switch to TUNE, METER switch to ALC. Peak the DRIVE control. If the meter pegs or goes out of the ALC range, reduce the CARRIER control setting for an on-scale reading. (the CAR control is a level adjustment, while the drive control is a resonative, adjustment.)

NOTE:

The TUNE position permits tuning of the final tank circuit at reduced power without danger to the tubes. In the TUNE position, the screen voltage to the finals is reduced approximately 50% and the keying circuit is closed.

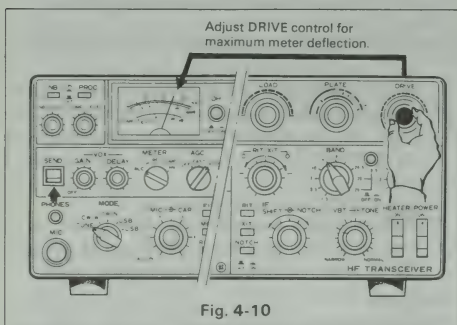


Fig. 4-10

- Place the METER switch to RF and peak the PLATE control.

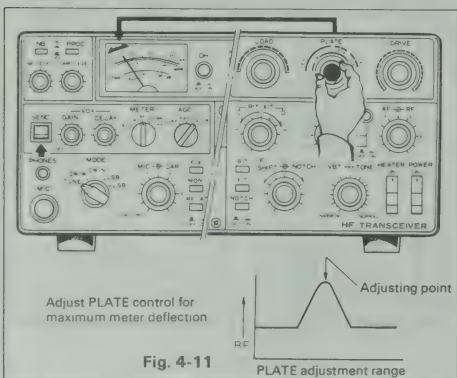


Fig. 4-11

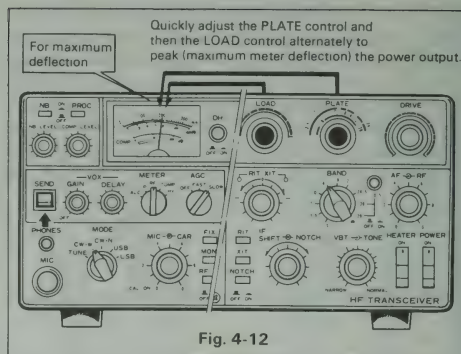


Fig. 4-12

- Place the METER switch to RF, MODE switch to CW. Close the Key and repeat the LOAD and PLATE for maximum RF output. You may at your option also redip the Plate for maximum RF output. Open the Key. You are tuned up for CW operation. If necessary, adjust the RF VOLT control on the rear panel to bring the output reading to about 2/3 scale. This is a meter adjustment, not an output adjustment.

Table 4-1. Summary of Transmitter Tuning Procedure

MODE Switch	METER Switch	Stand-by Switch	Procedure
USB or LSB	IP	REC→ SEND	Adjust BIAS control for 60 ma.
TUNE	ALC	REC→ SEND	Peak the ALC reading with the DRIVE control.
TUNE	RF	REC→ SEND	Peak the RF reading with the PLATE control.
CW	RF	REC→ SEND	Peak RF output by alternately adjusting the PLATE and LOAD controls.

(1) SSB OPERATION

Tune the TS-830S as described in steps 1 through 7. Set the MODE switch per Table 4-2, to USB or LSB and connect a microphone to the MIC input.

NOTE:

International Amateur practice dictates using USB or LSB as in Table 4-2.

To operate SSB, connect a microphone. (The Key and CARRIER control have no effect in SSB mode.) Place the MODE switch to SSB, METER switch to ALC. Adjust the MIC gain control for an on scale ALC reading on voice peaks. (Disregard RF and Ip meter readings in SSB- they are not accurate or relevant.)

TABLE 4-2.

1.8 MHz Band	LSB
3.5 MHz Band	LSB
7 MHz Band	LSB
10 MHz Band	USB
14 MHz Band	USB
18 MHz Band	USB
21 MHz Band	USB
24.5 MHz Band	USB
28 MHz Band	USB

■ PTT (Push to talk) OPERATION

By using a microphone equipped with a PTT switch, the transceiver is ready for PTT operation. To key, depress the PTT switch with the stand-by switch left in the REC position.

NOTE:

1. Transmission is impossible with the BAND switch set to AUX 10, 18 or 24.5.
2. Do not set the unit to the transmission mode when the BAND switch is set to AUX or is in midway between AUX and 1.5. Doing so will damage the drive vacuum tube 12BY7A.

4.4 TRANSMISSION (II)

To obtain maximum transmitter performance from your TS-830S you should understand the proper operation of the following controls and switches.

(1) SPEECH PROCESSOR

In SSB operation (particularly DX operation), it may be desirable to increase "talk-power" by using the speech processor. This may make the difference between a marginal, and a copiable signal.

Operation

The speech processor system in the TS-830S is an RFclipper using two filters, one in the VBT circuit and the other in the IF.

Turn the PROCESS switch ON and place the METER switch to COMP. Adjust the COMP LEVEL control while speaking into the microphone in a NORMAL tone of voice for a peak COMP scale reading of about 10-20 dB. Do not overdrive the COMPRESSOR: This will deteriorate voice quality, increase transmitter noise level, and in general make copying your signal more difficult.

Next, set the METER switch to ALC and adjust the MIC control while speaking into the microphone. Ensure that meter deflection is within the ALC zone.

(2) VOX (Voice Operated Transmit) OPERATION

Adjust the transceiver as described in the previous paragraph. Flip the VOX switch on and while speaking into the microphone, increase the VOX GAIN control until the VOX relay just operates. For VOX operation it is sometimes desirable to close-talk the microphone to prevent background noises from tripping the transmitter.

Check that the ALC reading for voice peaks is still within range on the meter. If necessary, adjust the MIC control for proper ALC reading.

If the VOX circuit is activated by speaker output, adjust the ANTI-VOX control (on the rear panel) as necessary for proper VOX operation.

Do not use excessive VOX or ANTI VOX gain more than necessary to control VOX operation. If the VOX circuit transfers between words, or holds too long, adjust the release time constant by the DELAY control.

(3) XIT

By using XIT, transmit frequency can be shifted independent of receive frequency.

With the XIT switch ON, the XIT is controlled by the RIT/XIT knob and transmit frequency can be shifted by about ± 2 kHz. When both the RIT and XIT switches are ON, both receive and transmit are shifted without adjusting the main tuning.

(4) MONITOR

To monitor transmitted SSB signal quality, turn the MONITOR switch ON to demodulate and sample a part of the transmit IF signal.

This feature is useful for checking modulation, or when adjusting the speech processor.

When monitoring, use a headphone to avoid audio feedback.

NOTE:

If the HEATER switch is OFF or the DRIVE control is incorrectly adjusted, the ALC circuit will not operate properly, causing excessively high transmit IF signal level, resulting in a distorted monitor signal.

(5) CW OPERATION

Tune and load the TS-830S as described in Sections 4.3. Using shielded line, connect a key to the rear panel KEY jack, set the MODE switch to CW, and set the stand-by switch to SEND for transmitting.

CW transmission is automatically monitored through the transceiver's speaker. Sidetone audio gain can be adjusted through the opening in the bottom cover.

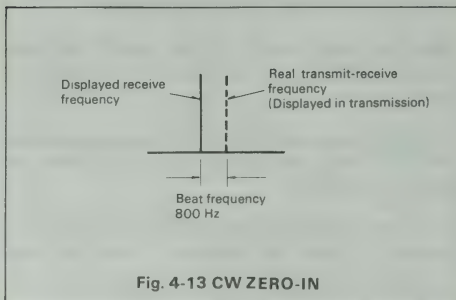


Fig. 4-13 CW ZERO-IN

(i) Reception

The TS-830S operates in two different CW modes: WIDE and NARROW. In the WIDE mode, the SSB filter (pass bandwidth 2.4 kHz, -6 dB) and an audio filter are used.

In the NARROW mode, option CW filters (YK-88C, YK-88CN, YG-455C, YG-455CN) are used to narrow the IF pass bandwidth to 500 Hz (-6 dB) or 250 Hz along with the audio filter. In both modes, high frequencies are cut off so the receive signal can be heard without high-frequency noise interference.

■ OPERATION WITHOUT CW FILTER

To receive CW, set the IF SHIFT control to its center position and the RIT switch to OFF. Adjust the main tuning for about an 800 Hz beat and your transmit frequency will be tuned (zeroed) to the transmit frequency of the station you are receiving. During reception, the side tone is activated by the key (VOX off). In this case, listen to the side tone superimposed on the receive signal and adjust the main tuning for similar side tone and incoming CW audio tone. By doing so, transmit frequencies will be zeroed. You may now adjust the RIT for a pitch which suits your preference. If interference is encountered, adjust the IF SHIFT. For more convenient and effective CW operation, use of the optional CW filters is recommended.

■ OPERATION WITH CW FILTER (OPTION)

Set the IF SHIFT to its center position and the RIT OFF. Adjust the main tuning for maximum S-meter deflection. Receive signal pitch will be about 800 Hz, indicating correct tuning.

■ KEY CONNECTION (Fig. 4-7)

Your key should be connected as illustrated in Fig. 4-14. When using an electronic keyer, make sure that polarity is correct. Use shielded line from the key to transceiver.

NOTE:

When using an electronic keyer, set polarity of the keyer for NEGATIVE keying.

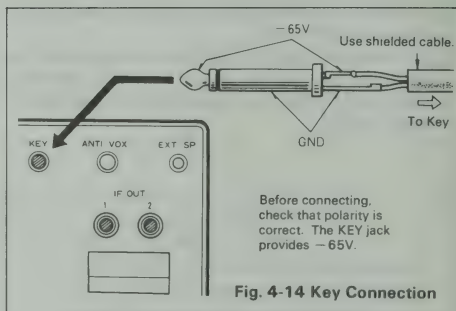


Fig. 4-14 Key Connection

■ SEMI-BREAK-IN OPERATION

The TS-830S has a built-in side-tone oscillator to permit semi-break-in operation, besides the normal CW operation. During semi-break-in operation, the transceiver is set in transmit mode when the key is depressed, and returns to receive mode when the key is released. For semi-break-in operation, place the STANDBY switch to REC and turn the VOX GAIN control ON. Adjust the DELAY control for your preference.

4.5 FIXED CHANNEL OPERATION

A fixed channel is available for common use on all bands by installing a crystal in the socket on the PLL unit (X50-1680-00). The crystal frequency can be computed by the following formula:

$$\text{Crystal Frequency (MHz)} = 5.5 \text{ MHz} - X + \text{Operating Frequency (MHz)}$$

X = Band Switch frequency (1.5, 3.5, etc.)

Crystal specifications: See Fig. 4-15

NOTE:

TRIO-KENWOOD does not supply crystals.

The shift set circuit CW frequency between transmit and receive, and the RIT/XIT circuit are not effective in FIXED CHANNEL OPERATION.

To use the fixed frequency oscillator, depress the FIX push switch.

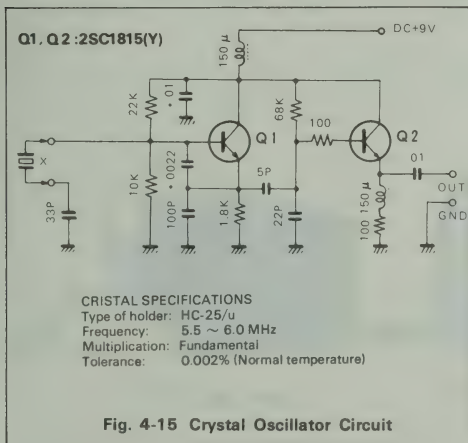
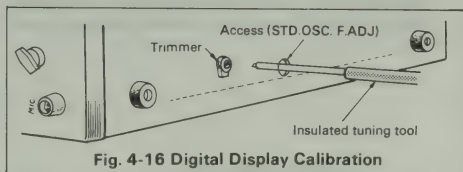


Fig. 4-15 Crystal Oscillator Circuit

4.6 DIGITAL DISPLAY CALIBRATION

Connect the antenna and set the BAND switch to WWV. Turn the main tuning dial to receive 10 MHz WWV. Adjust the dial until a low-frequency beat is heard. Next, turn the MIC control to the CAL position and a marker signal will be superimposed on the WWV signal. A double beat (two beat signals of high and low frequencies) will now be heard. Adjust the IF shift for low AF response.

While receiving this double beat, adjust the Standard oscillator trimmer through the reference frequency adjustment access opening (on the bottom of the TS-830S) so the two beats are heard as a single beat. Repeat this procedure 2 or 3 times. This completes calibration of the Digital Display. After calibration turn of the CAL switch.

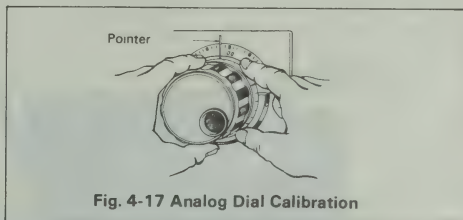


4.7 ANALOG DIAL CALIBRATION

The main dial scale is graduated at 1 kHz intervals. One revolution of the main dial covers 25 kHz. To calibrate the scale, turn the MIC control to the CAL position. Zero-beat in SSB or CW mode. Hold the main tuning knob from rotating and slip the calibration ring to the nearest major (5 kHz) graduation. The dial is now calibrated.

NOTE:

For exact frequency, read the Digital Display.



SECTION 5. OPTIONAL ACCESSORIES

5.1 OPTIONAL ACCESSORIES

The following optional accessories are available for use with the TS-830S.

■ REMOTE VFO

VFO-230:

The VFO-230 digital VFO provides maximum efficiency and flexibility for all operating conditions, including split-frequency operation, by combining a 20 Hz step digital VFO with five memories.

■ ANTENNA TUNER

AT-230:

The AT-230 antenna tuner includes the three new bands and such functional features as a through-line wattmeter, SWR meter and antenna selector switch.

■ EXTERNAL SPEAKER

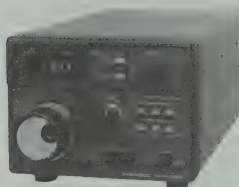
SP-230:

The SP-230 is a low-distortion speaker with selectable frequency response for high intelligibility in any mode. The frequency response is determined by the built-in audio filters, which are effective in improving signal-to-noise ratio under certain interference conditions, or when receiving weak signals.

■ LINEAR AMPLIFIER

TL-922A:

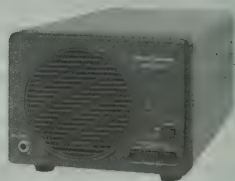
The TL-922A is an HF linear amplifier operating at maximum legal power, and employing a pair of 3-5002 high performance transmitting tubes.



VFO-230



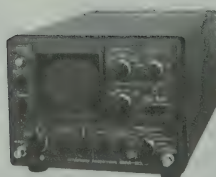
AT-230



SP-230



TL-922A



SM-220

■ STATION MONITOR

SM-220:

Based on a wide-frequency-range oscilloscope (up to 10 MHz), the SM-220 station monitor features, in combination with a built-in two-tone generator, a wide variety of waveform-observing capabilities. An optional feature is a unique pan-display capability.

■ PHONE PATCH

PC-1: (Available only where phone patch operation is legal.)

■ HEAD PHONES

HS-5, HS-4: 8 Ω communications headphones.

■ MICROPHONE

MC-50: Desk Microphone (50 k Ω /500 Ω)

MC-35S: Noise Cancelling Hand Microphone (50 k Ω)

MC-30S: Noise Cancelling Hand Microphone (500 Ω)

■ FILTER

YG-455C: 500 Hz CW filter for 455 kHz IF

YG-455CN: 250 Hz CW filter for 455 kHz IF

YK-88C: 500 Hz CW filter for 8.83 MHz IF

YK-88CN: 270 Hz CW filter for 8.83 MHz IF

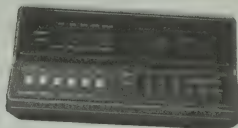
■ DIGITAL WORLD CLOCK

HC-10:

The HC-10 is a highly advanced world clock with dual display which can memorized 10 world major cities and 2 additional regions.



PC-1



HC-10



HS-4



HS-5



MC-50

5.2 INSTALLATION OF ACCESSORIES

■ REMOVING THE CABINET (See Fig. 5-1)

Figure 5-1 illustrates cabinet removal. Remove the eight top-cover and eight bottom-cover screws and lift away the panels.

NOTE:

This product uses metric hardware.

CAUTION:

The speaker lead is attached to the chassis, so be careful when removing the top cover.

The lead can be unplugged, if necessary.

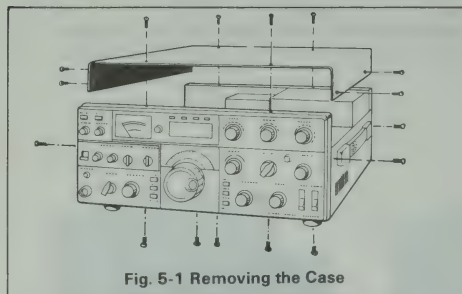


Fig. 5-1 Removing the Case

■ CW FILTER INSTALLATION

- Using a number 2 Phillips screwdriver, remove the top cover (eight screws). Unplug the speaker and set the cover aside.
- Remove the bottom cover (eight screws).
- Remove the eight screws holding the IF unit X48-1290-00 and swing the printed-circuit board up and towards the front of the radio.
- Using a 45-W (or less) soldering pencil, clear the six holes for the filter, if they are filled with solder.
- There is no polarity to the filter. Install the filter into its position on the IF unit. Solder the two mounting tabs and the four input and output pins to the circuit boards. Solder sparingly, and heat the connections only long enough to insure a good solder joint. Don't overheat the filter or circuit board.
- Carefully inspect your soldering. Be certain that all pins are actually soldered, and that you have not soldered across any spots on the board or between any of the pins on the filter. Clip the pins flush to the board.
- Replace the IF unit. Make certain no wires will be pinched underneath the board. Replace the six screws.
- Move the connector as illustrated from CW1 to CW2 ~ CW4.
- Reinstall the bottom cover. Reconnect the speaker lead, and reinstall the top cover.

- Apply power and verify your work. Filter installation is now complete.

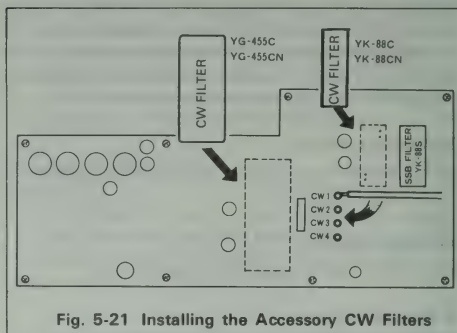


Fig. 5-21 Installing the Accessory CW Filters

8.8307 MHz	455.7 kHz	Terminal
YK-88C	—	CW ₂
YK-88CN	—	CW ₂
—	YG-455C	CW ₃
—	YG-455CN	CW ₃
YK-88C or YK-88CN	YG-455C or YG-455CN	CW ₄

■ VFO-230 CONNECTION (Fig. 5-3)

Connect the VFO-230 as shown in Fig. 5-3.

You will enjoy advanced operation including split-frequency capability by combining a 20 Hz step digital VFO with five memories.

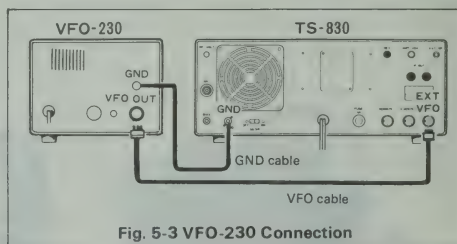


Fig. 5-3 VFO-230 Connection

■ ACCESSORY CONNECTIONS

Fig. 5-4 shows the ACSY connector. This DIN plug can be used for attaching a linear amplifier or other external accessories to the transceiver. Always use shielded line for all functions.

NOTE:

ALWAYS use shielded line for all connections.

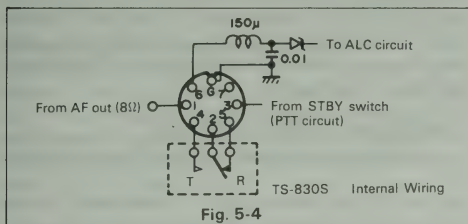


Fig. 5-4

■ SSTV, AFSK OPERATION

The TS-830S will adapt very well to slow scan television or AFSK RTTY operation. For SSTV, the only cabling required are connections between the MIC connector of the TS-830S and the camera output, and between the SPEAKER jack and the monitor input.

When transmitting, adjust the transmitter output so that final input power is less than 100W (less than 125 mA Ip), or for approximately 1/2 of normal output power. for AFSK, connect the T.U. output to the MIC input, and speaker output to the T.U. input.

■ PHONE PATCH OPERATION

The PC-1 Phone Patch may be used with the TS-830S. Recommended settings are:

PC-1	RX Gain	4
	TX Gain	4
	Null as necessary	
TS-830S	Vox Gain	1
	AF Gain	4
	Mic Gain	5
	Anti Vox Max	

Most other patches will work satisfactorily without any modification to the radio, requiring only an external speaker connection, and that the Mic line be run through the patch.

For those operators who desire a Patch input similar to the TS-520S or TS-820S, an input connection and terminal must be added at the Mic input preamp circuit.

Use a 100 kΩ resistor in series, with a 10 kΩ to ground on the input side of the 100 kΩ resistor. Use shielded line, and connect as follows:

On the IF unit X48-1290-00 install the fixed divider at the junction of R111 10 kΩ, C103, 100 pF and C104 1 μF (input of Q32). Add an RCA jack at one of the predrilled hole on the rear panel for input.

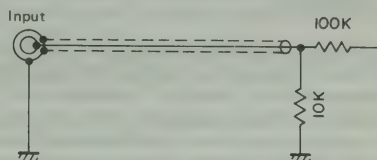


Fig. 5-5
Optional Special Phone Patch Input.

■ EXTENSION FEET

The TS-830S is provided with two extension feet which can be used to elevate the front panel. In some operating positions the tilt makes it easier to read the dial and meter. Fig. 5-6 shows how to install the feet.

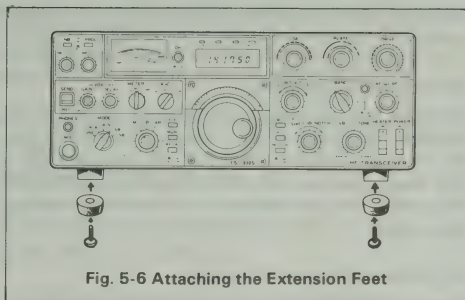


Fig. 5-6 Attaching the Extension Feet

SECTION 6. MAINTENANCE AND ALIGNMENT

CAUTION:

DANGEROUS HIGH VOLTAGES ARE PRESENT WITHIN THE CASE OF THE TS-830S WHEN THE TRANSCEIVER IS TURNED ON.

EXERCISE EXTREME CAUTION TO AVOID ELECTRIC SHOCK.

6.1 GENERAL

Your TS-830S has been factory aligned and tested to specification before shipment. Under normal circumstances the transceiver will operate in accordance with these operating instructions. All adjustable trimmers and coils in your transceiver were preset at the factory and should only be readjusted by a qualified technician with proper test equipment.

Attempting service or alignment without factory authorization can void the transceivers warranty.

■ CLEANING

The knobs, front panel and cabinet of the TS-830S are likely to become soiled after extended use. The knobs should be removed from the transceiver and cleaned with a neutral soap and warm water. Use a neutral soap (not harsh chemicals) and a damp cloth to clean the cabinet and front panel.

■ FUSE REPLACEMENT

When the fuse blows, there is some cause. Be sure to find the cause before attempting operation. Use a 6 amp fuse for 120VAC operation. Under no circumstances use a higher amperage fuse than specified. Extensive damage can be caused. Also, the warranty will be void if an oversized fuse is used.

■ FAN MOTOR LUBRICATION

Every 8 months dust out the final compartment, and apply a few drops of light machine oil to the front and rear fan motor bearings.

WARNING:

Be certain to disconnect power, and to discharge high voltage before servicing in the final compartment.

6.2 SERVICE POSITION

The TS-830S should be placed on its side, with the final section up, for any alignment or service. This position permits adequate ventilation for the final tubes as well as easy accessibility to the modules. Most of the described adjustments can be made without removing the boards from the transceiver.

6.3 RECEIVER ADJUSTMENTS

■ RIT ZERO (AF-AVR UNIT)

When the RIT circuit is turned on, and the RIT control is set to zero, the receive frequency should be exactly the same as the transmit frequency. If the frequency is not the same, adjust the RIT zero preset control, VR2.

To zero the RIT, turn on the calibrator and tune the VFO for about a 1000 Hz calibrator tone. Turn the RIT control to zero. Turn the RIT switch ON and adjust VR2 for the same 1000 Hz tone. Push the RIT switch ON and OFF to be sure the tones are identical.

■ NOTCH ADJUSTMENT (IF UNIT)

Turn the NOTCH switch OFF and center THE NOTCH control.

Receive a 25 kHz marker signal at 1.9 MHz with a 1.5 kHz beat frequency.

Turn the NOTCH switch ON.

While monitoring AF output through the speaker, adjust L10 and VR1 alternately to minimize this signal.

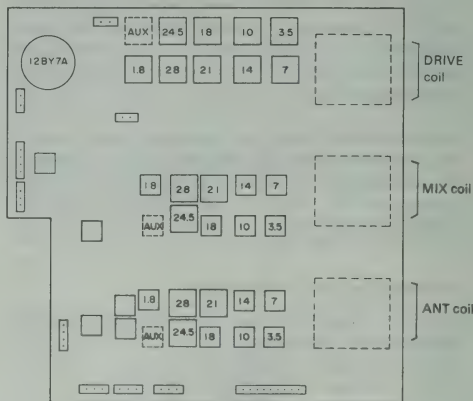


Fig. 6-1

FRONT Panel

BAND Switch	Frequency for adjustments
1.5	1.9 MHz
3.5	3.75
7	7.15
10	10.125
14	14.175
18	18.125
21	21.225
24.5	24.95
28.5	28.8

Table 6-1

■ ADJUSTMENT OF ANT AND MIX COILS (COIL PACK UNIT)

The ANT and MIX coils are included in the coil pack unit. Use the 25 kHz calibrator as a signal. Connect a 50Ω dummy load to terminate the receiver input. Set the DRIVE control to 12 o'clock. Adjust the ANT and MIX coils for maximum S meter deflection, following the frequency table. Start with the 1.8 MHz band and then proceed to other bands. To adjust the 10m band, use only 28.8 MHz in the 28.5 MHz band.

■ ADJUSTMENT OF RECEIVE IF COILS (RF AND IF UNITS)

Receive a marker signal using any frequency. Adjust the DRIVE and the main tuning for maximum S meter deflection. Adjust T2 on the RF unit and L5, L6, L7, L11 and L12 on the IF unit for maximum S meter indication. DO NOT adjust L3, L4, L5 and L9.

■ S METER ADJUSTMENT (IF UNIT)

Disconnect the antenna with the transceiver in receive mode. Zero-point adjustment:

Adjust VR2 for meter pointer zero indication. If a standard SIGNAL GENERATOR (SSG) is available, adjust VR3 so the S-meter indicates "S-9", at 14.175 MHz, 40 dB signal.

6.4 TRANSMITTER ADJUSTMENTS

■ TRANSMITTER NEUTRALIZATION

(See Internal View Bottom)

The TS-830S requires neutralization every time the final tubes are changed.

Tune up the TS-830S into a 50 ohm dummy load at 28.5 MHz for CW operation as described in Section 4. Set the SG switch to OFF and place a sensitive RF milli-voltmeter across the dummy load. Flip the stand-by switch to SEND and adjust TC1 (at the bottom of the final section) for a minimum reading on the voltmeter. After the final section is neutralized, flip the stand-by switch to REC and slide the SG switch ON.

A receiver tuned to 28.5 MHz works very well for neutralizing if an RF voltmeter is not available. Instead of tuning for a minimum voltage, tune for a minimum S-meter reading.

NOTE:

Since the drive tube operates into a fixed load (the finals) it is not always necessary to replace this tube when replacing the finals.

CAUTION:

Neutralization of the final section should be carried out with the chassis shield in place. Dangerous high voltages are present in the final section when the transceiver is turned on. Use an insulated tool to make this adjustment.

■ TRANSMIT DRIVE COIL ADJUSTMENT (RF UNIT)

The drive coils are part of the coil pack unit. Set the SG switch on the rear panel to OFF and center the DRIVE control (12 o'clock). Set the METER switch to ALC and the MODE switch to CW.W, CW.N or TUN.

With the standby switch in the SEND position, adjust the drive coils for maximum ALC deflection for each band using the same frequency and in the same order as for adjustment of ANT and MIX coils.

During adjustment, adjust the CAR control so there is just enough injection to swing the ALC meter.

■ TRANSMIT IF COIL ADJUSTMENT (IF AND RF UNITS)

Using any frequency, place the transceiver in transmit mode in the CW.N, CW.W or TUN position. Adjust L28, 29 on the IF unit and T4 in the RF unit for maximum ALC deflection.

■ CARRIER BALANCE ADJUSTMENT (IF UNIT)

With a 50Ω dummy load connected to the ANT terminal, adjust for maximum output at 14.175 MHz. Reduce mic gain to zero. Set the transceiver in LSB mode and adjust the RF VOLT control on the rear panel for maximum sensitivity. The RF meter will deflect if the carrier is unbalanced. To balance the carrier, alternately adjust trimmer TC2 and trimpot VR4 until the meter indicates minimum. Switch to USB mode and if the pointer deflects, readjust so the pointer deflects equally for both LSB and USB.

■ ADJUSTMENT OF SIDE TONE LEVEL (AF-AVR UNIT)

Adjust VR1 to your preference.

■ ADJUSTMENT OF MONITOR LEVEL (IF UNIT)

Adjust VR8 to your preference.

5.5 TRANSMITTING ON WARC BANDS

As supplied, the TS-830S will receive but not transmit on the 3 new WARC bands. If transmit capability is desired, a minor wiring change is required.

- For all 3 bands: Break the line between the RF unit X44-1360-00, connector #6, Pin #1 (TOF terminal) and AF unit X49-1140-00, connector #6, Pin #4 (TOF terminal).
- Or, for individual Bands: On the RF unit X44-1360-00:

Band	Remove (or Cut) Part
10 MHz	D4
18 MHz	D5
24.5 MHz	D6

6.6 ORDERING SPARE PARTS

When ordering replacement or spare parts for your equipment, be sure to specify the following information: Model and serial number of the equipment. Schematic number of the part. Printed circuit board number on which the part is located. Part number and name, if known, and Quantity desired.

NOTE: _____

A full Service Manual is available as a separate publication.

6.6 SERVICE

Should it ever become necessary to return the equipment for repair, pack in its original boxes and packing, and include a full description of the problems involved. Also include your telephone number. You need not return accessory items unless directly related to the service problem.

You may return your radio for service to the Authorized Kenwood Dealer from whom you purchased it. A copy of the service report will be returned with the unit. Please do not send sub-assemblies or printed circuit boards. Send the complete unit, in its original boxes and packing. If you want verification of receipt, please supply a self-addressed card (or letter) and you will be informed of the date of receipt and estimated service time.

SERVICE NOTE: _____

Dear OM, if you desire to correspond on a technical or operational problem, please make your note short, complete, and to the point. And PLEASE make it readable.

Please list: Model and serial number.

The question or problem you are having.

Please give sufficient detail to diagnose; other equipment in the station, meter readings and anything you feel might be useful in attempting diagnosis.

NOTE: _____

1. Record the date of purchase, serial number and dealer from whom purchased.
 2. For your own information, retain a written record of any maintenance performed on the unit.
 3. When claiming warranty service, please include a photocopy of the bill of sale, or other proof of purchase showing the date of sale.
-

SECTION 7. TROUBLESHOOTING

6.1 GENERAL

The problems described in this table are failures caused in

general by improper operation or connection of the transceiver, not by defective components. There is a separate service manual for repair of the TS-830S.

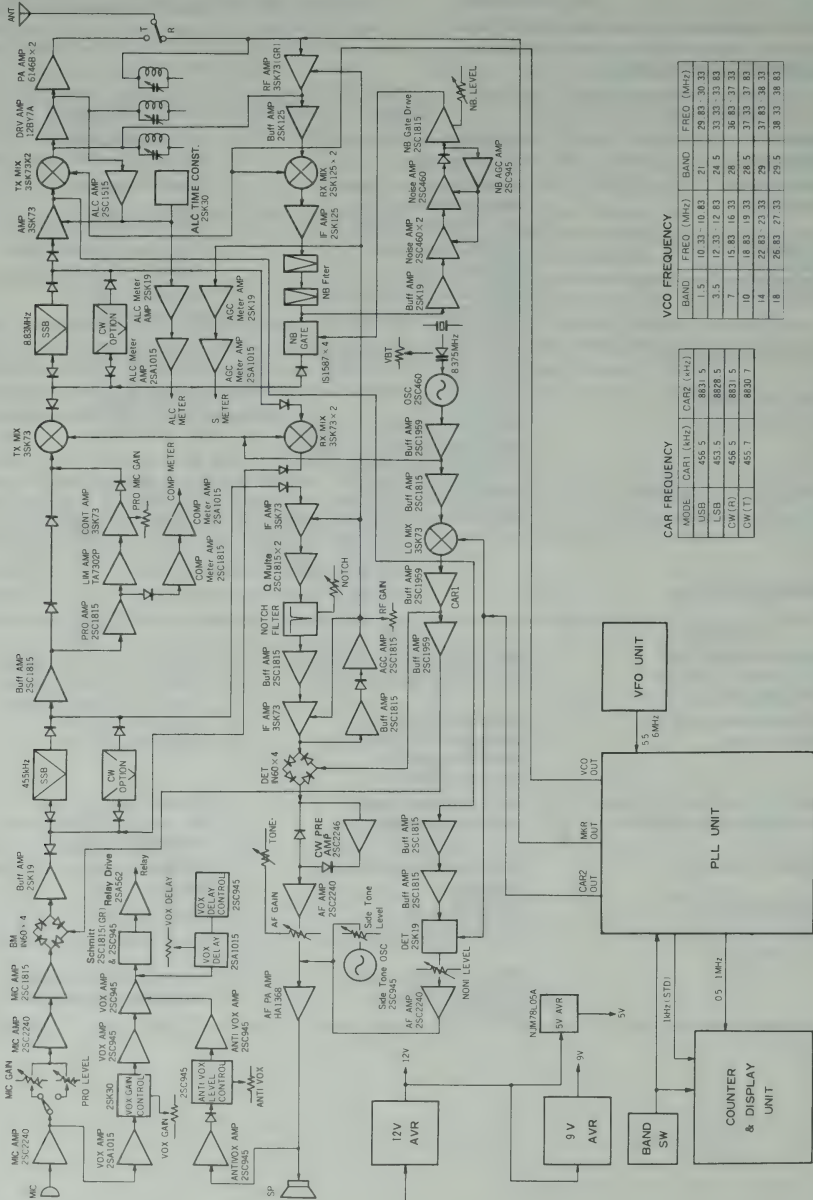
TRANSMITTER SECTION

SYMPTOMS	CAUSE	REMEDY
No output (No plate current)	No voltage on the screen grid of the final tubes.	Turn the SG switch on the rear panel ON.
No output on SSB (No plate current)	1. Open microphone cable or bad microphone. 2. Low microphone gain.	1. Check the microphone. 2. Increase the MIC control.
There is output, but the RF meter shows no output.	RF VOLT control not adjusted correctly.	Adjust control for 2/3 scale reading at full output.
VOX does not operate.	1. VOX GAIN control too low. 2. ANTI VOX control requires adjustment.	1. See section 4.4 2. See section 4.4
VOX trips by speaker output.	ANTI VOX control requires adjustment.	See section 4.4
XIT control inoperative	XIT switch is off.	Push XIT button.
Mic or radio chassis is "hot" during TX.	Excess RF in the shack. No earth ground, poor ground, or antenna is too close to the radio.	See section 2
Poor audio in SSB, TX-feedback	Excess RF in the shack.	See section 2
RF volt reading varies by band.	SWR differences between bands	Retune antenna system.

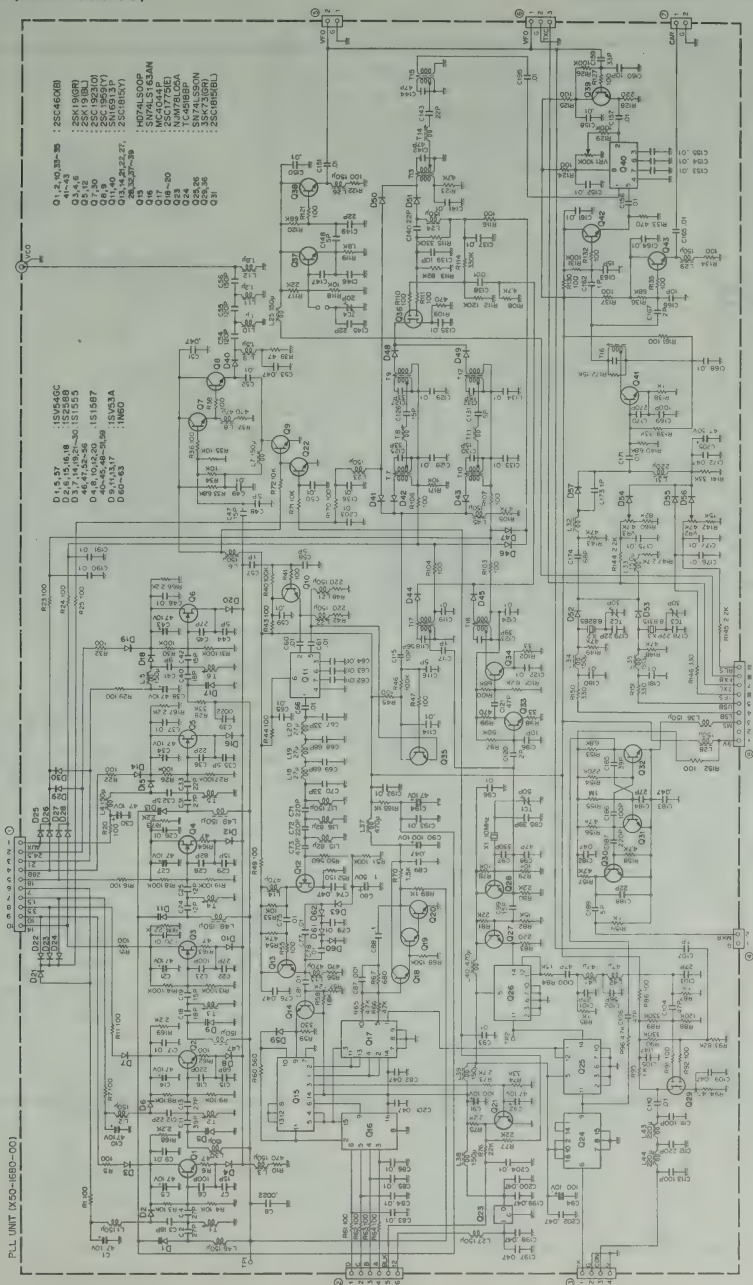
RECEIVER SECTION

SYMPTOM	CAUSE	REMEDY
Pilot lights do not light and there is no receiver noise when the POWER switch is turned on.	1. Bad power cable or connections. 2. Blown power supply fuse.	1. Check cables and connections. 2. Check for the cause of the blown fuse and replace the fuse.
An antenna is connected but no signals are heard.	1. FIX SW is turned ON. 2. Microphone PTT switch (or stand-by switch) is in the transmit position.	1. Turn the FIX SW off. 2. Release the PTT switch.
An antenna is connected but S-meter deflects without a received signal.	1. RF GAIN control closed. 2. Low AC line voltage.	1. Open RF GAIN control. 2. Use a step-up transformer to raise the line voltage.
SSB signal unintelligible	MODE switch is set to wrong sideband.	Turn MODE switch to the correct sideband.
RIT control inoperative.	RIT switch is off.	Push RIT button.
SSB received signal is extremely high cut or low cut.	1. IF shift is out of adjustment. 2. VBT is out of adjustment. 3. TONE control is out of adjustment.	1. Set to the center (click) position. 2. Set to the NORMAL position. 3. Set to the center position.

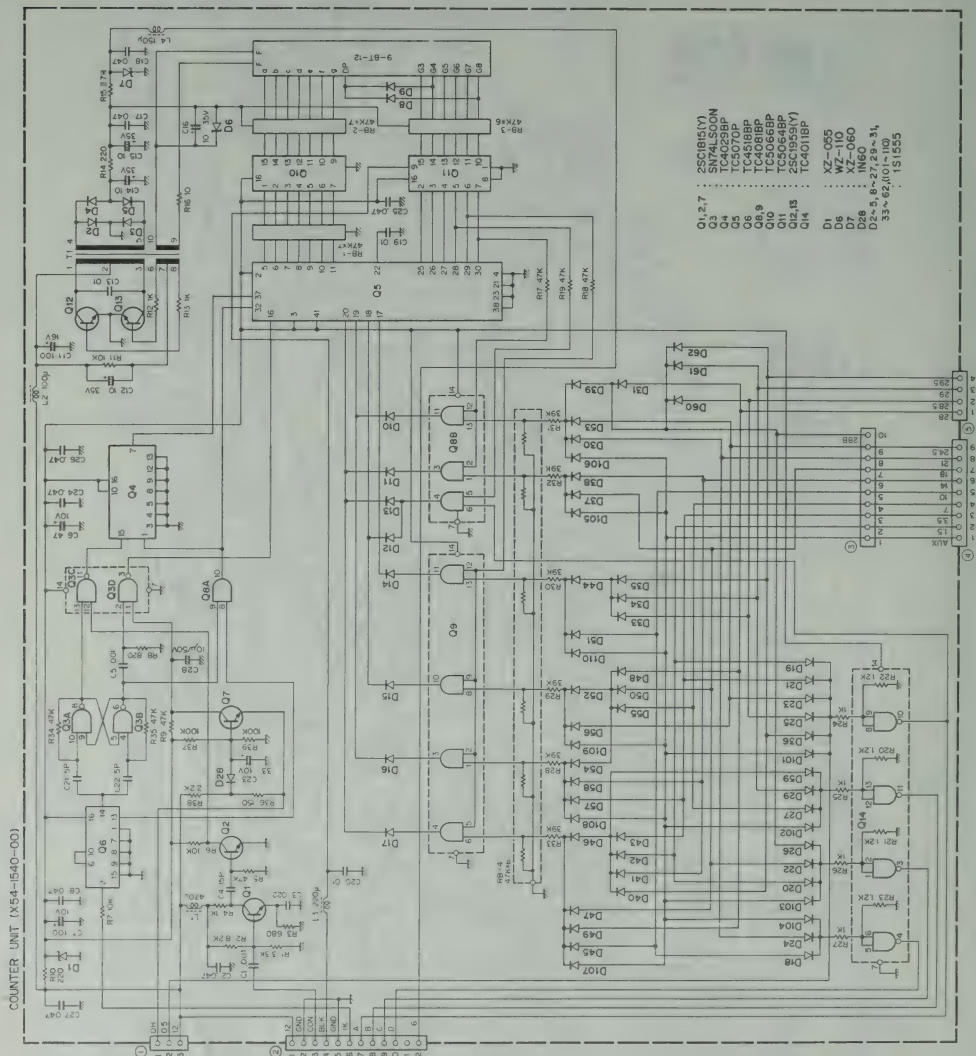
TS-830S BLOCK DIAGRAM



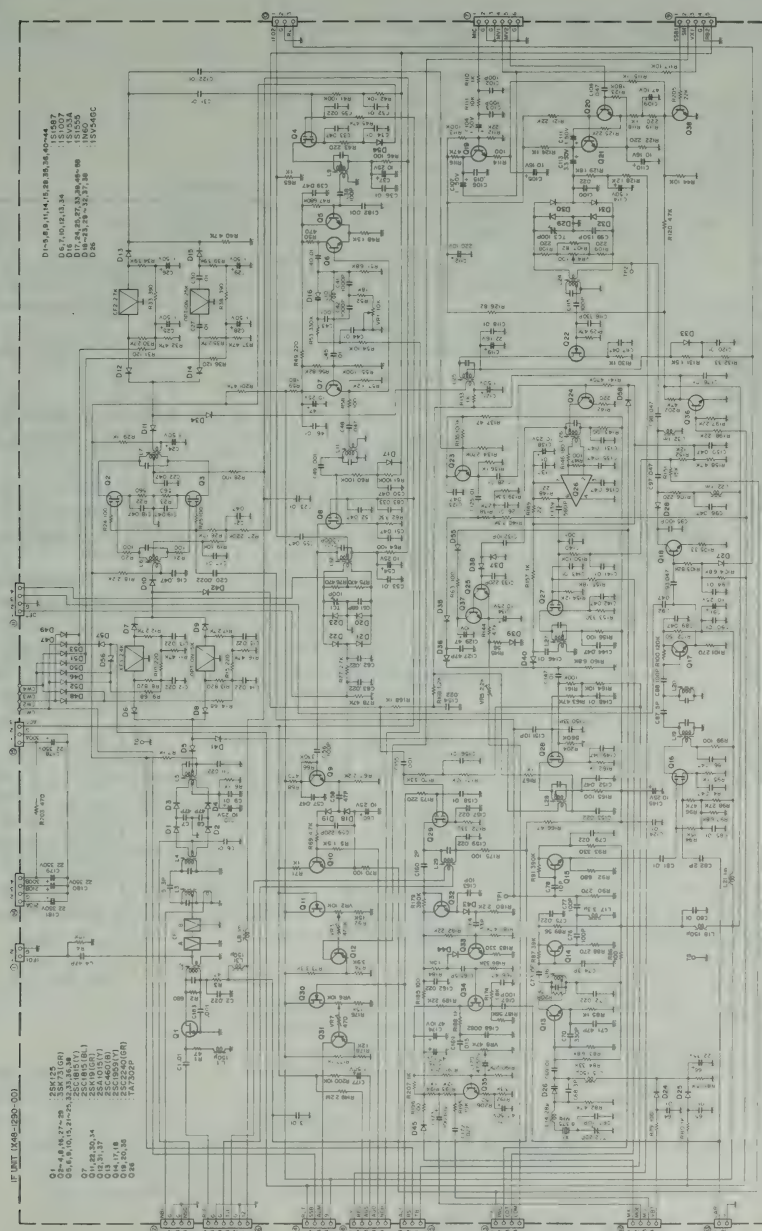
PLL UNIT (X50-1680-00)



COUNTER UNIT (X45-1540-00)



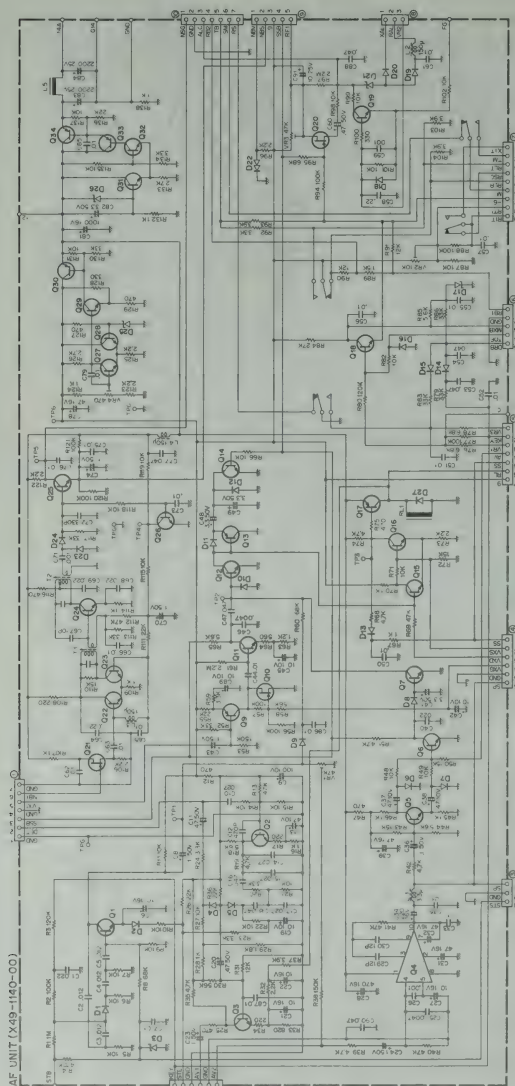
IF UNIT (X48-1290-00)



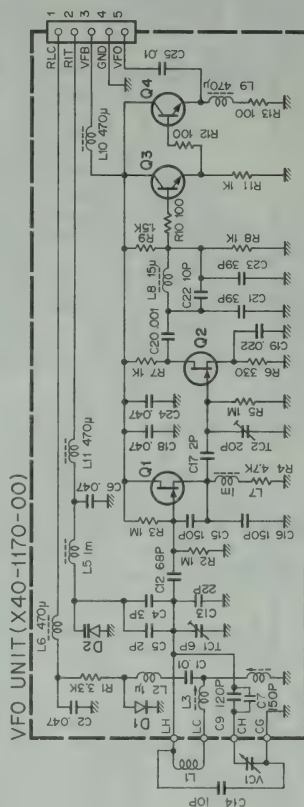
TS-830S SCHEMATIC DIAGRAM

AF UNIT (X49-1140-00)

VFO UNIT (X40-1170-00)



AF UNIT (X49-1140-00)



VFO UNIT (X40-1170-00)

Q1,2 ; 2SK19(Y) D1 ; IS2588
Q3 ; 2SC460(B) D2 ; ISV53A
Q4 ; 2SC1959(Y)

TS-830S SPECIFICATIONS

[GENERAL]

Frequency Range	160 m Band 1.8 ~ 2.0 MHz 80 m Band 3.5 ~ 4.0 MHz 40 m Band 7.0 ~ 7.3 MHz * 30 m Band 10.1 ~ 10.15 MHz (10.0 MHz WWV) 20 m Band 14.0 ~ 14.35 MHz * 17 m Band 18.068 ~ 18.168 MHz 15 m Band 21.0 ~ 21.45 MHz * 12 m Band 24.89 ~ 24.99 MHz 10 m Band 28.0 ~ 29.7 MHz
Modes	SSB/CW
Power Requirement	120V AC (220V modifiable), 50/60 Hz
Power Consumption	Transmit: 295 watts Receive: 32 watts (with heaters off)
Dimensions	333 (13.3) × 133 (5.3) × 333 (13.3) mm (inch)
Weight	13.5 kg (29.8 lbs)

[TRANSMITTER]

* Final Power Input	220W PEP for SSB operation 180W DC for CW operation
Audio Input Impedance	500Ω ~ 50 kΩ
RF Output Impedance	50Ω ~ 75Ω
Frequency Stability	Within 100 Hz during any 30 minute period after warmup. Within 1 kHz during the first hour after 1 minute of warmup.
Carrier Suppression	Better than 40 dB
Sideband Suppression	Better than 60 dB
Spurious Radiation	Better than 60 dB
Harmonic Radiation	Better than 40 dB
Audio Freq. Response	400 to 2,600 Hz, within -6 dB
3rd Order Intermodulation Distortion	Better than -36 dB

[RECEIVER]

Receiver Sensitivity	0.25 μV at 10 dB S + N/N
Image Ratio	Better than 60 dB
IF Rejection	Better than 80 dB
Receiver Selectivity	
SSB/CW WIDE	2.4 kHz (-6 dB), 3.6 kHz (-60 dB)
CW NARROW	With YK-88C (option) 500 Hz (-6 dB), 1.5 kHz (-60 dB) With YK-88CN (option) 270 Hz (-6 dB), 1.1 kHz (-60 dB) With YG-455C (option) 500 Hz (-6 dB), 820 Hz (-60 dB) With YG-455CN (option) 250 Hz (-6 dB), 500 Hz (-60 dB)
Variable Bandwidth	
SSB	500 Hz ~ 2.4 kHz (-6 dB) continuously variable
CW	150 Hz ~ 500 Hz (-6 dB) continuously variable With optional filter YK-88C and YG-455C added.
Notch-filter Attenuation	Better than 40 dB
Audio Output Impedance	8 ~ 16Ω
Audio Output	1.5W (8Ω)

*Will transmit on the new 30, 17, and 12 meter bands. Diodes installed for preventing accidental transmission before government Amateur authorization.

NOTE: The circuit and ratings may change without notice due to developments in technology.

SECTION 1. INTRODUCTION AND FEATURES

1.1 KENWOOD TS-830S

The TS-830S is a highly sophisticated solid state Amateur band transceiver employing only three vacuum tubes.

Operating on all Amateur bands between 1.8 and 29.7 MHz, this unit is constructed modularly. The TS-830S includes many built-in features usually found as extras on other transceivers. Included are VOX, 25 kHz calibrator, RIT, RF attenuator, and an effective noise blanker. The TS-830S also includes automatic gain control (AGC), automatic level control (ALC), semi-break-in CW with sidetone, a speech processor, speaker and built-in AC power supply.

Designed for operation on SSB or CW, the TS-830S delivers more than 220 watts PEP input.

Any complicated electronic device will be damaged if operated incorrectly, and this transceiver is no exception. Please read all of the operating instructions before putting the TS-830S on the air.

1.2 FEATURES

1. Interference-free DX operation

* Variable bandwidth IF filter circuit (VBT)

The built-in VBT (Variable Bandwidth Tuning) circuit allows IF filter pass-bandwidth to be varied as you wish to eliminate unpleasant interference. It is adjustable independent of the IF shift.

* IF shift circuit

The IF SHIFT is a circuit to shift IF pass-bandwidth without changing receive frequency. It eliminates interference or adjusts receive frequency characteristic as desired.

* High reliability 455 kHz notch circuit

Interference is also eliminated by the built-in notch circuit. The TS-830S uses 455 kHz notch-frequency. The notch circuit shifts the BFO frequency and the mixer local frequency at the same time, thereby equivalently changing the notch frequency. Thus, accurate notch characteristic is realized even when the notch point is changed, completely eliminating nearby interference signals.

* NARROW/WIDE BANDWIDTH selection and optional filters for enhanced CW operation:

NARROW or WIDE CW operation can be selected when using the following optional filters:

YK-88C (500 Hz), YK-88CN (270 Hz),

YG-455C (500 Hz), YG-455CN (250 Hz)

* Variable tone control circuit.

2. WARC bands

The TS-830S fully covers 160-10 m Amateur bands, including the new WARC bands of 10, 18 and 24.5 MHz.

3. All-in-one, compact AC Power supply system

4. Advanced circuit design for improved two-signal characteristics. Cleverly designed front-end circuit components and receive circuit system assure excellent two-signal characteristics. Cross-modulation and blocking are reduced.

5. TX final unit uses 6146B's

The finals are a pair of 6146B transmitting tubes. RF negative feedback and amplified ALC provide clear, strong signals with reduced cross modulation.

6. Variable level noise blanker

Conventional fixed level noise blankers are sometimes less than effective in removing pulsating noise over weak signals or rejecting strong interference signals. This variable level noise blanker is equipped to control the optimum threshold level of the gate pulse amplifier.

7. RF speech processor to increase average power during SSB operation

This is an RF clipper speech processor, using both the 455 kHz and 8.83 MHz IF's. Unwanted frequency components are removed by the 8.83 MHz crystal filter, providing a compression ratio of approximately 20 dB.

8. Transmit monitor circuit

The built-in monitor circuit permits easy adjustment of the RF processor and MIC GAIN.

9. XIT (Transmit Incremental Tuning) for fine adjustment of transmit frequency independent of receive frequency.

10. A combination of precise, easy-to-read digital frequency indicator and an analog dial.

The digital indicator has a Digital Hold memory function.

11. The controls are arranged on the die-cast front panel for easy operation.

12. A full variety of accessory circuits are provided:

The TS-830S includes:

VOX circuit (available for Semi-Break in), Marker circuit, side-tone oscillator, 3-position AGC circuit (OFF, FAST, SLOW), RF ATT, FIX circuit, Audio frequency characteristics selector circuit for each MODE, CW zero-in circuit, IF OUT terminal, HEATER switch, SG switch, Built-in speaker.

SECTION 2. INSTALLATION

2.1 UNPACKING

Remove the TS-830S from its shipping container and packing material and examine it for visible damage. If the equipment has been damaged in shipment, notify the transportation company immediately. Save the boxes and packing material for future shipping or moving.

The following accessories should be included with the transceiver.

- | | |
|--|---|
| 1. Instruction Manual (B50-2738-00) | 1 |
| 2. Plastic Extension Feet with Screws
(J02-0049-14) | 2 |
| 3. Speaker Plug 1/8" (E12-0001-05) | 1 |
| 4. 7P DIN Plug (E07-0751-05) | 1 |
| 5. Fuse (6A) (F05-6021-05) | 1 |

2.2 OPERATING LOCATION

As with any solid state electronic equipment, the TS-830S should be kept from extremes of heat and humidity. Choose an operating location that is dry and cool, and avoid operating the transceiver in direct sunlight. Also, allow at least 3 inches clearance between the back of the equipment to any object. This space allows an adequate air flow from the ventilating fan to keep the transceiver cool.

CAUTION:

Do not operate the radio in an RF Field greater than 6V RF. Receiver damage may occur.

2.3 CABLING (See Figure 2-1.)

■ GROUND

To prevent electric shock, and reduce the possibility of TVI and BCI, connect the transceiver to a good earth ground, through as short a lead as possible. Use ground rods or metal cold water feedline.

■ ANTENNA

Connect through a 50 ohm antenna feedline to the coaxial connector on the rear panel.

■ KEY

If CW operation is desired, connect a key to the KEY jack. Use shielded line or coaxial cable.

■ POWER CONNECTIONS

Make sure the POWER switch on the front panel is turned off, the stand-by switch is in the REC position, and the line voltage is correct. Then connect the POWER cord to the line source.

■ AC POWER

For fixed station operation, the TS-830S operates from 120 VAC, 50/60 Hz power source capable of supplying 280 watts or more.

2.4 MICROPHONE

Attach the microphone connector to a suitable microphone, as shown in Figure 2-1. Be sure the microphone PTT switch is separate from the microphone circuit, as shown in Figure 2-3.

It should be noted that a microphone with a 3P plug using a common ground terminal should not be used.

The microphone input is designed for 50 kohm microphones. The choice of microphone is important for good speech quality, and should be given serious consideration. The crystal lattice filter in the transceiver provides all the restriction necessary on audio response, and further restriction in the microphone is not required. It is more important to have a microphone with a smooth, flat response throughout the speech range.

Follow the microphone manufacturer's instructions for connecting the microphone cable to the plug. With many microphones, the push-to-talk button must be pressed to make microphone audio available. For VOX operation, this unwanted feature may be eliminated, if desired, by opening the microphone case and permanently connecting the contacts which control the microphone audio.

Standard microphone sensitivity is within the range of -50 dB to -60 dB. If a microphone having a higher sensitivity is used, the ALC and compressor circuits will not function properly. In this case, insert in the mike line an attenuator as shown in Fig. 2-1. A typical MIC gain control setting is 12 o'clock. If you must run this control at 9 o'clock or less, use an attenuator.

2.5 KEY

If CW operation is desired, connect a key to the KEY jack. Use shielded cable, and a standard (mono or 2P) phone plug.

TS-830S SPECIFICATIONS

[GENERAL]

Frequency Range	160 m Band 1.8 ~ 2.0 MHz 80 m Band 3.5 ~ 4.0 MHz 40 m Band 7.0 ~ 7.3 MHz * 30 m Band 10.1 ~ 10.15 MHz (10.0 MHz WWV) 20 m Band 14.0 ~ 14.35 MHz * 17 m Band 18.068 ~ 18.168 MHz 15 m Band 21.0 ~ 21.45 MHz * 12 m Band 24.89 ~ 24.99 MHz 10 m Band 28.0 ~ 29.7 MHz
Modes	SSB/CW
Frequency Stability	Within 100 Hz during any 30 minute period after warmup. Within 1 kHz during the first hour after 1 minute of warmup.
Power Requirement	120V AC (220V modifiable), 50/60 Hz
Power Consumption	Transmit: 295 watts Receive: 32 watts (with heaters off)
Dimensions	333 (13.3) × 133 (5.3) × 333 (13.3) mm (inch)
Weight	13.5 kg (29.8 lbs)

[TRANSMITTER]

*Final Power Input	220W PEP for SSB operation 180W DC for CW operation
Audio Input Impedance	500Ω ~ 50 kΩ
RF Output Impedance	50Ω ~ 75Ω
Carrier Suppression	Better than 40 dB
Sideband Suppression	Better than 60 dB
Spurious Radiation	Better than 60 dB
Harmonic Radiation	Better than 40 dB
Audio Freq. Response	400 to 2,600 Hz, within -6 dB
3rd Order Intermodulation Distortion	Better than -36 dB

[RECEIVER]

Receiver Sensitivity	0.25 μV at 10 dB S+N/N
Image Ratio	Better than 60 dB
IF Rejection	Better than 80 dB
Receiver Selectivity	
SSB/CW WIDE	2.4 kHz (-6 dB), 3.6 kHz (-60 dB)
CW NARROW	With YK-88C (option) 500 Hz (-6 dB), 1.5 kHz (-60 dB) With YK-88CN (option) 270 Hz (-6 dB), 1.1 kHz (-60 dB) With YG-455C (option) 500 Hz (-6 dB), 820 Hz (-60 dB) With YG-455CN (option) 250 Hz (-6 dB), 500 Hz (-60 dB)
Variable Bandwidth	
SSB	500 Hz ~ 2.4 kHz (-6 dB) continuously variable
CW	150 Hz ~ 500 Hz (-6 dB) continuously variable With optional filter YK-88C and YG-455C added.
Notch-filter Attenuation	Better than 40 dB
Audio Output Impedance	8 ~ 16Ω
Audio Output	1.5W (8Ω)

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* Variable tone control circuit.

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3. All-in-one, compact AC Power supply system

4. Advanced circuit design for improved two-signal characteristics. Cleverly designed front-end circuit components and receive circuit system assure excellent two-signal characteristics. Cross-modulation and blocking are reduced.

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7. RF speech processor to increase average power during SSB operation

This is an RF clipper speech processor, using both the 455 kHz and 8.83 MHz IF's. Unwanted frequency components are removed by the 8.83 MHz crystal filter, providing a compression ratio of approximately 20 dB.

8. Transmit monitor circuit

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9. XIT (Transmit Incremental Tuning) for fine adjustment of transmit frequency independent of receive frequency.

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Audio Input Impedance	500Ω ~ 50 kΩ
RF Output Impedance	50Ω ~ 75Ω
Carrier Suppression	Better than 40 dB
Sideband Suppression	Better than 60 dB
Spurious Radiation	Better than 60 dB
Harmonic Radiation	Better than 40 dB
Audio Freq. Response	400 to 2,600 Hz, within -6 dB
3rd Order Intermodulation Distortion	Better than -36 dB

[RECEIVER]

Receiver Sensitivity	0.25 μV at 10 dB S+N/N
Image Ratio	Better than 60 dB
IF Rejection	Better than 80 dB
Receiver Selectivity	
SSB/CW WIDE	2.4 kHz (-6 dB), 3.6 kHz (-60 dB)
CW NARROW	With YK-88C (option) 500 Hz (-6 dB), 1.5 kHz (-60 dB) With YK-88CN (option) 270 Hz (-6 dB), 1.1 kHz (-60 dB) With YG-455C (option) 500 Hz (-6 dB), 820 Hz (-60 dB) With YG-455CN (option) 250 Hz (-6 dB), 500 Hz (-60 dB)

Variable Bandwidth

SSB	500 Hz ~ 2.4 kHz (-6 dB) continuously variable
CW	150 Hz ~ 500 Hz (-6 dB) continuously variable With optional filter YK-88C and YG-455C added.

Notch-filter Attenuation

Audio Output Impedance

Audio Output

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Carrier Suppression	Better than 40 dB
Sideband Suppression	Better than 60 dB
Spurious Radiation	Better than 60 dB
Harmonic Radiation	Better than 40 dB
Audio Freq. Response	400 to 2,600 Hz, within -6 dB
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Variable Bandwidth

SSB	500 Hz ~ 2.4 kHz (-6 dB) continuously variable
CW	150 Hz ~ 500 Hz (-6 dB) continuously variable With optional filter YK-88C and YG-455C added.
Notch-filter Attenuation	Better than 40 dB
Audio Output Impedance	8 ~ 16Ω
Audio Output	1.5W (8Ω)

*Will transmit on the new 30, 17, and 12 meter bands. Diodes installed for preventing accidental transmission before government Amateur authorization.

NOTE: The circuit and ratings may change without notice due to developments in technology.

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WARNING: _____
HIGH VOLTAGES PRESENT.

CONTENTS

SPECIFICATIONS	3
SECTION 1. INTRODUCTION AND FEATURES	4
SECTION 2. INSTALLATION	5
2.1. Unpacking	
2.2. Operating Location	
2.3. Cabling	
2.4. Microphone	
2.5. Key	
2.6. External Speaker and Headphones	
2.7. Ground	
2.8. Antenna	
SECTION 3. CONTROLS AND THEIR FUNCTIONS	8
3.1. Front Panel	
3.2. Rear Panel	
SECTION 4. OPERATION	14
4.1. Reception (I)	
(1) Basic Procedures for Receive Operation	
(2) WWV Reception	
4.2. Reception (II)	
(1) RF ATT Switch	
(2) RF Gain Control	
(3) AGC (Automatic Gain Control)	
(4) RIT/XIT	
(5) VBT Control (Variable Bandwidth Tuning)	
(6) IF Shift	
(7) VBT and IF Shift Combination	
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(10) Tone Control	
4.3. Transmission (I)	
(1) SSB Operation	
4.4. Transmission (II)	
(1) Speech Processor	
(2) VOX (Voice Operated Transmit) Operation	
(3) XIT (Transmitter Incremental Tuning)	
(4) Monitor	
(5) CW Operation	
4.5. Fixed Channel Operation	
4.6. Digital Display Calibration	
4.7. Analog Dial Calibration	
SECTION 5. OPTIONAL ACCESSORIES	22
5.1. Optional Accessories	
5.2. Installation of Accessories	
SECTION 6. MAINTENANCE AND ALIGNMENT ..	26
6.1. General	
6.2. Service Position	
6.3. Receiver Adjustments	
6.4. Transmitter Adjustments	
6.5. Transmitting on WARC BANDS	
6.6. Ordering Spare Parts	
6.7. Service	
TROUBLESHOOTING	28
BLOCK DIAGRAM.....	30
SCHEMATIC DIAGRAM.....	31
INTERNAL VIEW	36



HF TRANSCEIVER

Model TS-830S



INSTRUCTION MANUAL



HF TRANSCEIVER

Model TS-830S



INSTRUCTION MANUAL

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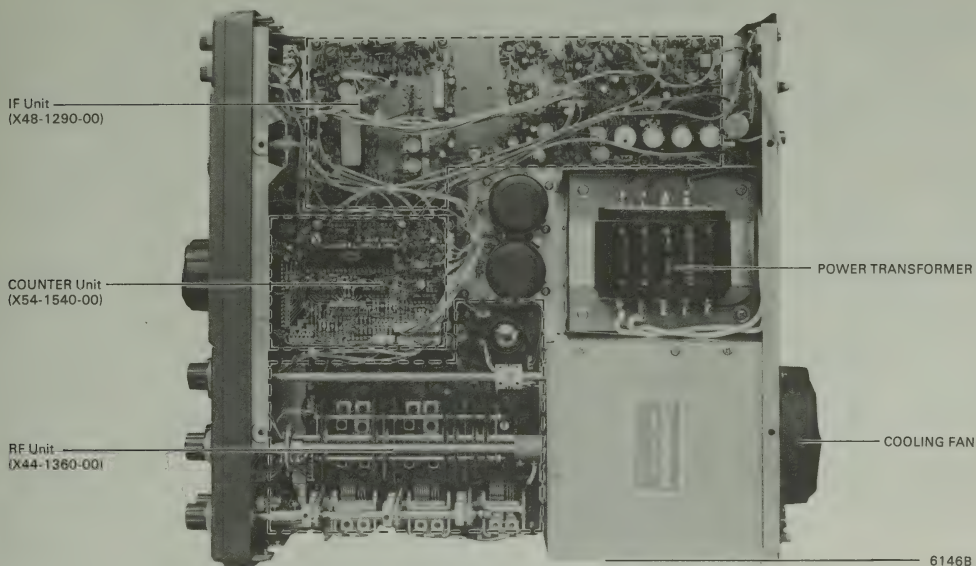
WARNING: _____
HIGH VOLTAGES PRESENT.

CONTENTS

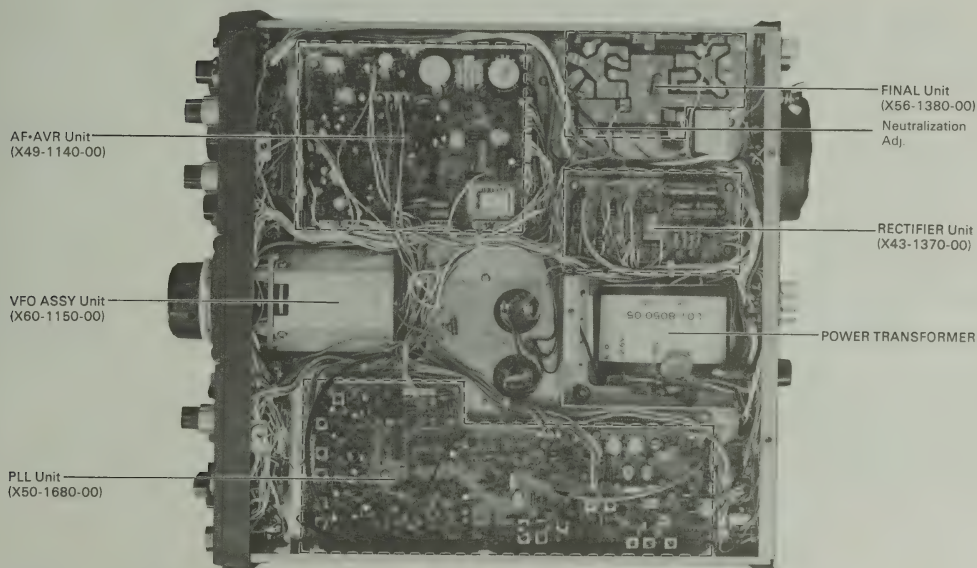
SPECIFICATIONS	3
SECTION 1. INTRODUCTION AND FEATURES	4
SECTION 2. INSTALLATION	5
2.1. Unpacking	
2.2. Operating Location	
2.3. Cabling	
2.4. Microphone	
2.5. Key	
2.6. External Speaker and Headphones	
2.7. Ground	
2.8. Antenna	
SECTION 3. CONTROLS AND THEIR FUNCTIONS ..	8
3.1. Front Panel	
3.2. Rear Panel	
SECTION 4. OPERATION	14
4.1. Reception (I)	
(1) Basic Procedures for Receive Operation	
(2) WWV Reception	
4.2. Reception (II)	
(1) RF ATT Switch	
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(7) VBT and IF Shift Combination	
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4.3. Transmission (I)	
(1) SSB Operation	
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(4) Monitor	
(5) CW Operation	
4.5. Fixed Channel Operation	
4.6. Digital Display Calibration	
4.7. Analog Dial Calibration	
SECTION 5. OPTIONAL ACCESSORIES	22
5.1. Optional Accessories	
5.2. Installation of Accessories	
SECTION 6. MAINTENANCE AND ALIGNMENT ..	26
6.1. General	
6.2. Service Position	
6.3. Receiver Adjustments	
6.4. Transmitter Adjustments	
6.5. Transmitting on WARC BANDS	
6.6. Ordering Spare Parts	
6.7. Service	
TROUBLESHOOTING	28
BLOCK DIAGRAM	30
SCHEMATIC DIAGRAM	31
INTERNAL VIEW	36

INTERNAL VIEW



Top View



Bottom View

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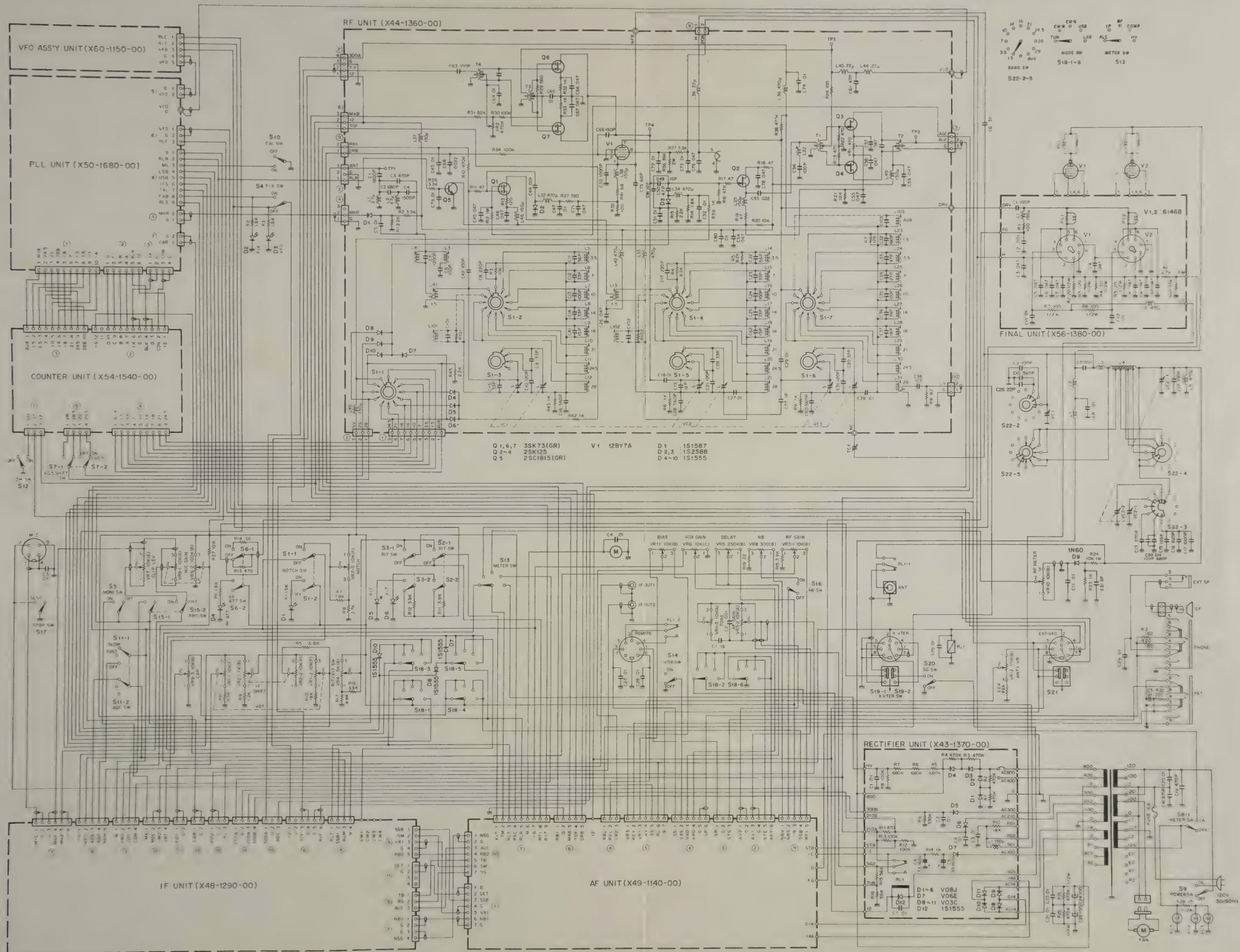
CAUTION: Read Operating Manual Section 4. before placing transmitter in service.

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CONTENTS

SPECIFICATIONS	3
SECTION 1. INTRODUCTION AND FEATURES	4
SECTION 2. INSTALLATION	5
2.1. Unpacking	
2.2. Operating Location	
2.3. Cabling	
2.4. Microphone	
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SECTION 3. CONTROLS AND THEIR FUNCTIONS ..	8
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4.1. Reception (I)	
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(10) Tone Control	
4.3. Transmission (I)	
(1) SSB Operation	
4.4. Transmission (II)	
(1) Speech Processor	
(2) VOX (Voice Operated Transmit) Operation	
(3) XIT (Transmitter Incremental Tuning)	
(4) Monitor	
(5) CW Operation	
4.5. Fixed Channel Operation	
4.6. Digital Display Calibration	
4.7. Analog Dial Calibration	
SECTION 5. OPTIONAL ACCESSORIES	22
5.1. Optional Accessories	
5.2. Installation of Accessories	
SECTION 6. MAINTENANCE AND ALIGNMENT ..	26
6.1. General	
6.2. Service Position	
6.3. Receiver Adjustments	
6.4. Transmitter Adjustments	
6.5. Transmitting on WARC BANDS	
6.6. Ordering Spare Parts	
6.7. Service	
TROUBLESHOOTING	28
BLOCK DIAGRAM	30
SCHEMATIC DIAGRAM	31
INTERNAL VIEW	36

TS-830S SCHEMATIC DIAGRAM



Model TS-830S

Serial No.

Date of Purchase

Dealer

A product of
TRIO-KENWOOD CORPORATION
17-5, 2-chome, Shibuya, Shibuya-ku, Tokyo 150, Japan

TRIO-KENWOOD COMMUNICATIONS, INC.
1111 West Walnut Street, Compton, California, 90220 U.S.A.
TRIO-KENWOOD COMMUNICATIONS, GmbH
D 6374 Steinbach TS, Industriestrasse 8A, West Germany
TRIO-KENWOOD (AUSTRALIA) PTY. LTD.
30 Whiting Street, Artarmon, Sydney N.S.W. Australia 2064

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CONTENTS

SPECIFICATIONS	3
SECTION 1. INTRODUCTION AND FEATURES	4
SECTION 2. INSTALLATION	5
2.1. Unpacking	
2.2. Operating Location	
2.3. Cabling	
2.4. Microphone	
2.5. Key	
2.6. External Speaker and Headphones	
2.7. Ground	
2.8. Antenna	
SECTION 3. CONTROLS AND THEIR FUNCTIONS	8
3.1. Front Panel	
3.2. Rear Panel	
SECTION 4. OPERATION	14
4.1. Reception (I)	
(1) Basic Procedures for Receive Operation	
(2) WWV Reception	
4.2. Reception (II)	
(1) RF ATT Switch	
(2) RF Gain Control	
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(1) Speech Processor	
(2) VOX (Voice Operated Transmit) Operation	
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(4) Monitor	
(5) CW Operation	
4.5. Fixed Channel Operation	
4.6. Digital Display Calibration	
4.7. Analog Dial Calibration	
SECTION 5. OPTIONAL ACCESSORIES	22
5.1. Optional Accessories	
5.2. Installation of Accessories	
SECTION 6. MAINTENANCE AND ALIGNMENT ..	26
6.1. General	
6.2. Service Position	
6.3. Receiver Adjustments	
6.4. Transmitter Adjustments	
6.5. Transmitting on WARC BANDS	
6.6. Ordering Spare Parts	
6.7. Service	
TROUBLESHOOTING	28
BLOCK DIAGRAM	30
SCHEMATIC DIAGRAM	31
INTERNAL VIEW	36

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27

SECTION 6. MAINTENANCE AND ALIGNMENT

CAUTION:

DANGEROUS HIGH VOLTAGES ARE PRESENT WITHIN THE CASE OF THE TS-830S WHEN THE TRANSCEIVER IS TURNED ON.

EXERCISE EXTREME CAUTION TO AVOID ELECTRIC SHOCK.

6.1 GENERAL

Your TS-830S has been factory aligned and tested to specification before shipment. Under normal circumstances the transceiver will operate in accordance with these operating instructions. All adjustable trimmers and coils in your transceiver were preset at the factory and should only be readjusted by a qualified technician with proper test equipment.

Attempting service or alignment without factory authorization can void the transceivers warranty.

■ CLEANING

The knobs, front panel and cabinet of the TS-830S are likely to become soiled after extended use. The knobs should be removed from the transceiver and cleaned with a neutral soap and warm water. Use a neutral soap (not harsh chemicals) and a damp cloth to clean the cabinet and front panel.

■ REPLACEMENT FUSE

When the fuse blows, there is some cause. Be sure to find the cause before attempting operation. Use a 6 amp fuse for 120VAC operation. Under no circumstances use a higher amperage fuse than those specified. Extensive damage can be caused. Also, the warranty can be voided if an improper fuse is used.

■ FAN MOTOR LUBRICATION

Every 8 months dust out the final compartment, and apply a few drops of light machine oil to the front and rear fan motor bearings.

WARNING:

Be certain to disconnect power, and to discharge high voltage before servicing in the final compartment.

6.2 SERVICE POSITION

The TS-830S should be placed on its side, with the final section up, for any alignment or service. This position permits adequate ventilation for the final tubes as well as easy accessibility to the modules. Most of the described adjustments can be made without removing the boards from the transceiver.

6.3 RECEIVER ADJUSTMENTS

■ RIT ZERO (AF-AVR UNIT)

When the RIT circuit is turned on, and the RIT control is set to zero, the receive frequency should be exactly the same as the transmit frequency. If the frequency is not the same, adjust the RIT zero preset control, VR2.

To zero the RIT, turn on the calibrator and tune the VFO for about a 1000 Hz calibrator tone. Turn the RIT control to zero. Turn the RIT switch ON and adjust VR2 for the same 1000 Hz tone. Push the RIT switch ON and OFF to be sure the tones are identical.

■ NOTCH ADJUSTMENT (IF UNIT)

Turn the NOTCH switch OFF and center THE NOTCH control.

Receive a 25 kHz marker signal at 1.9 MHz with a 1.5 kHz beat frequency.

Turn the NOTCH switch ON.

While monitoring AF output through the speaker, adjust L10 and VR1 alternately to minimize this signal.

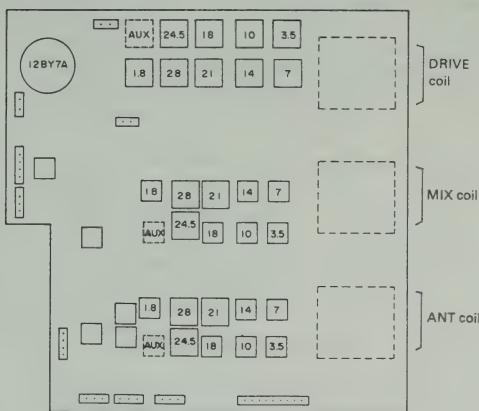


Fig. 6-1

FRONT Panel

BAND Switch	Frequency for adjustments
1.5	1.9 MHz
3.5	3.75
7	7.15
10	10.125
14	14.175
18	18.125
21	21.225
24.5	24.95
28.5	28.8

Table 6-1

■ ADJUSTMENT OF ANT AND MIX COILS (COIL PACK UNIT)

The ANT and MIX coils are included in the coil pack unit. Use the 25 kHz calibrator as a signal. Connect a 50Ω dummy load to terminate the receiver input. Set the DRIVE control to 12 o'clock. Adjust the ANT and MIX coils for maximum S meter deflection, following the frequency table. Start with the 1.8 MHz band and then proceed to other bands. To adjust the 10m band, use only 28.8 MHz in the 28.5 MHz band.

■ ADJUSTMENT OF RECEIVE IF COIL (RF AND IF UNITS)

Receive a marker signal using any frequency. Adjust the DRIVE and the main tuning for maximum S meter deflection. Adjust T2 on the RF unit and L5, L6, L7, L11 and L12 on the IF unit for maximum S meter indication. Do not adjust L3, L4, L5 and L9.

■ S METER ADJUSTMENT (IF UNIT)

Disconnect the antenna with the transceiver in receive mode. Zero-point adjustment:

Adjust VR2 for meter pointer zero indication. If a standard signal generator (SSG) is available, adjust VR3 so the S meter indicates "S-9", at 14.175 MHz, 40 dB signal.

6.4 TRANSMITTER ADJUSTMENTS

■ TRANSMITTER NEUTRALIZATION

The TS-830S requires neutralization every time the final tubes are changed.

Tune up the TS-830S into a 50 ohm dummy load at 28.5 MHz for CW operation as described in Section 4. Set the SG switch to OFF and place a sensitive RF milli voltmeter across the dummy load. Flip the stand-by switch to SEND and adjust TC1 (reached through the adjustment hole in the top of the final section) for a minimum reading on the voltmeter. After the final section is neutralized, flip the stand-by switch to REC and slide the SG switch ON.

A receiver tuned to 28.5 MHz, works very well for neutralizing if an RF voltmeter is not available. Instead of tuning for a minimum voltage, tune for a minimum S-meter reading.

NOTE:

Since the driver tube operates into a fixed load (the final) it is not always necessary to replace this tube when replacing the finals.

CAUTION:

Neutralization of the final section should be carried out with the chassis shield in place. Dangerous high voltages are present in the final section when the transceiver is turned on. Use an insulated tool to make this adjustment.

■ TRANSMIT DRIVE COIL ADJUSTMENT (RF UNIT)

The drive coils are part of the coil pack unit. Set the SG switch on the rear panel to OFF and center the DRIVE control (12 o'clock). Set the METER switch to ALC and the MODE switch to CW, W, CW, N or TUN.

With the standby switch in the SEND position, adjust the drive coils for maximum ALC deflection for each band using the same frequency and in the same order as for adjustment of ANT and MIX coils.

During adjustment, adjust the CAR control so there is just enough injection to swing the ALC meter.

■ TRANSMIT IF COIL ADJUSTMENT (IF AND RF UNITS)

Using any frequency, place the transceiver in transmit mode in the CW, N, CW, W or TUN position. Adjust L28, 29 on the IF unit and T4 in the RF unit for maximum ALC deflection.

■ CARRIER BALANCE ADJUSTMENT (IF UNIT)

With a 50Ω dummy load connected to the ANT terminal, adjust for maximum output at 14.175 MHz. Reduce mic gain to zero. Set the transceiver in LSB mode and adjust the RF VOLT control on the rear panel for maximum sensitivity. The RF meter will deflect if the carrier is unbalanced. To balance the carrier, (alternately) adjust trimmer TC2 and trimpot VR4 until the meter indicates minimum. Switch to USB mode and if the pointer deflects, readjust so the pointer deflects equally for both LSB and USB.

■ ADJUSTMENT OF SIDE TONE LEVEL (AF-AVR UNIT)

Adjust VR1 to your preference.

■ ADJUSTMENT OF MONITOR LEVEL (IF UNIT)

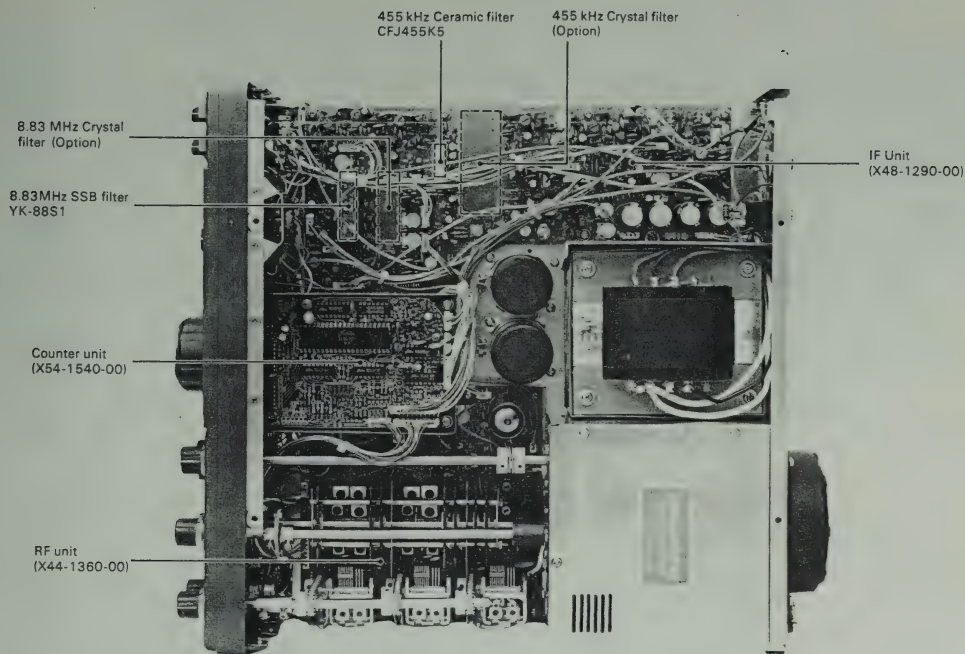
Adjust VR8 to your preference.

5.5 TRANSMITTING ON WARC BANDS

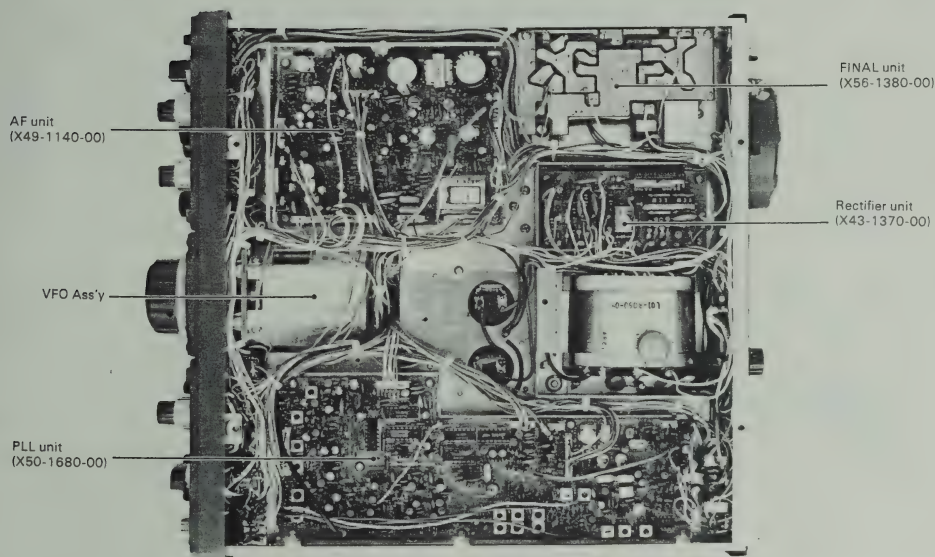
As supplied, the TS-830S will receive but not transmit on the 3 new WARC bands. If transmit capability is desired, a minor wiring change is required.

1. For all 3 bands: Break the line between the RF unit X44-1360-00, connector #6, Pin #1 (TOF terminal) and AF unit X49-1140-00, connector #6, Pin #4 (TOF terminal).
2. Or, for individual Bands: On the RF unit X44-1360-00.

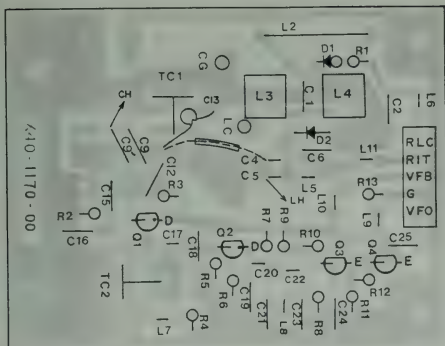
Band	Remove (or Cut) Part
10 MHz	D4
18 MHz	D5
24.5 MHz	D6



[(J) type is shown.]



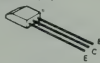
▼ VFO UNIT (X40-1170-00)



2SK19 (Y)



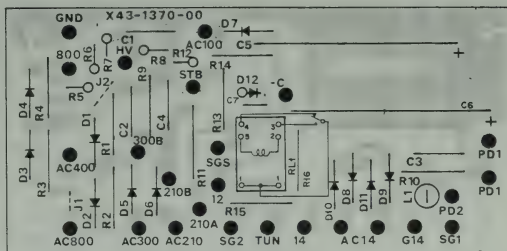
2SC460 (B)



2SC1959 (Y)



▼ RECTIFIER UNIT (X43-1370-00)

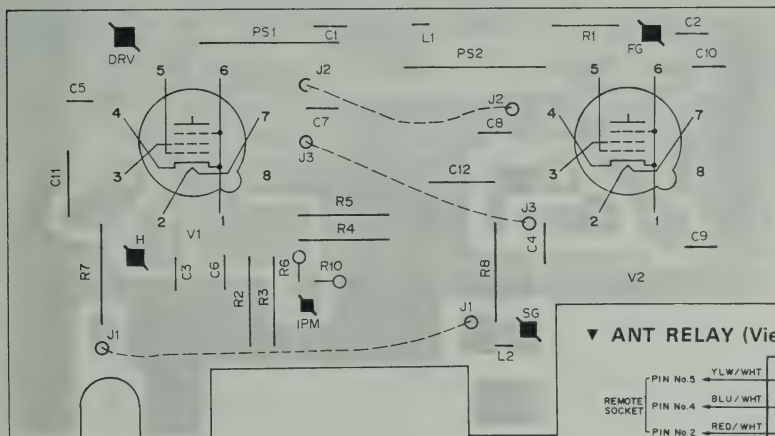


D1~6 V08J D7: V06E D8~11 V03C D12: 1S1555

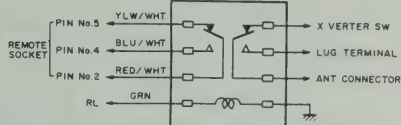
Q1.2 2SK19(Y) Q3 2SC460(B) or 2SC1675(L) Q4 2SC1959(Y)

D1 1S2588 D2 1SV53A

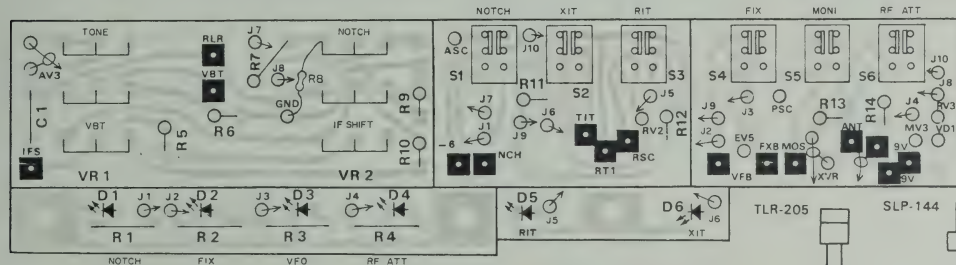
▼ FINAL UNIT (X56-1380-00) (View from foil side)



▼ ANT RELAY (View from terminal side)



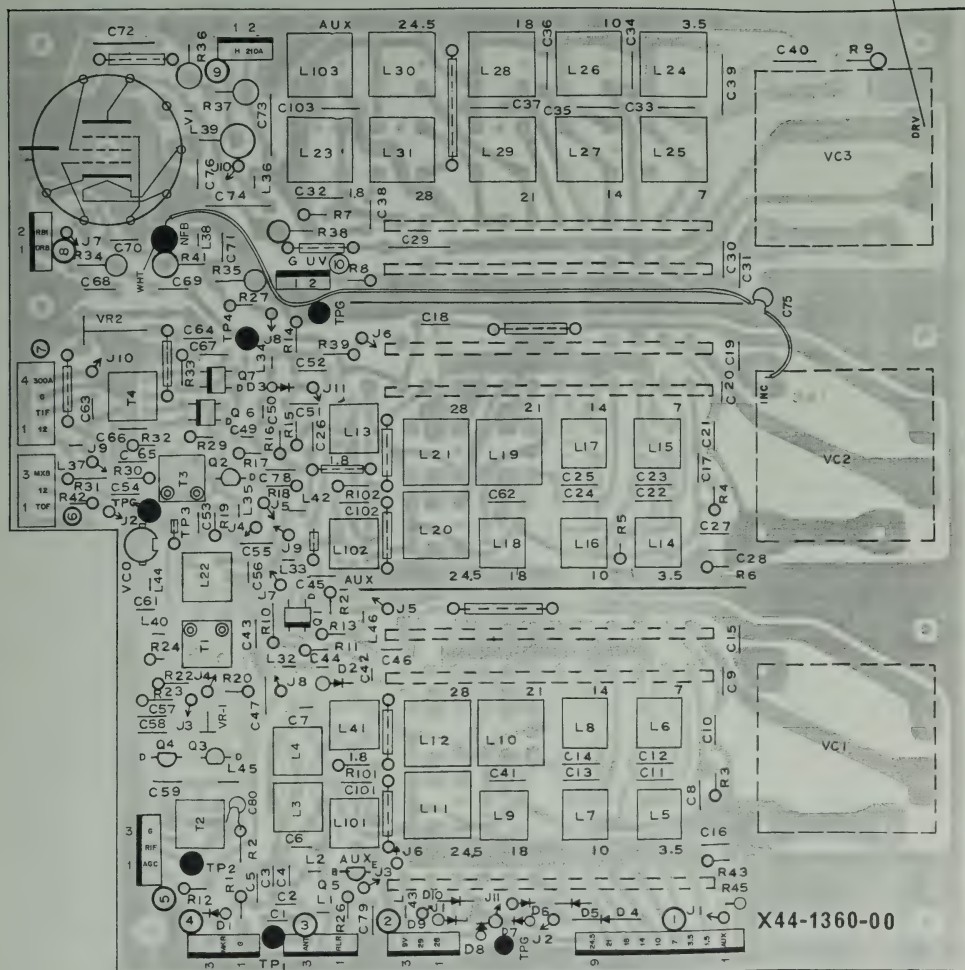
▼ SWITCH BOARD (J25-2773-03)



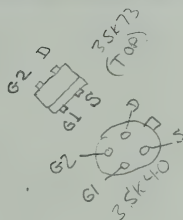
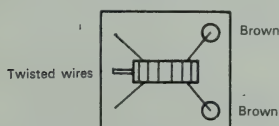
D1~4 TLR-205 D5.6 SLP-144

TS-830S PC BOARD VIEW

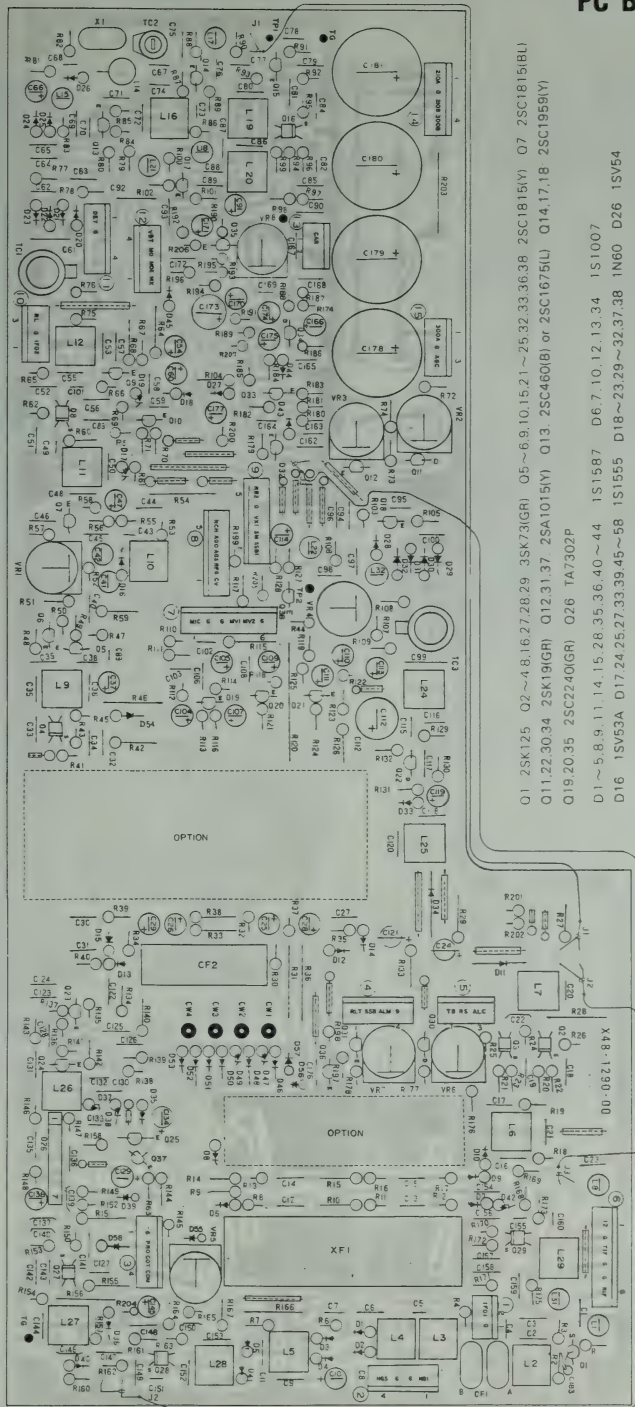
▼ RF UNIT (X44-1360-00)

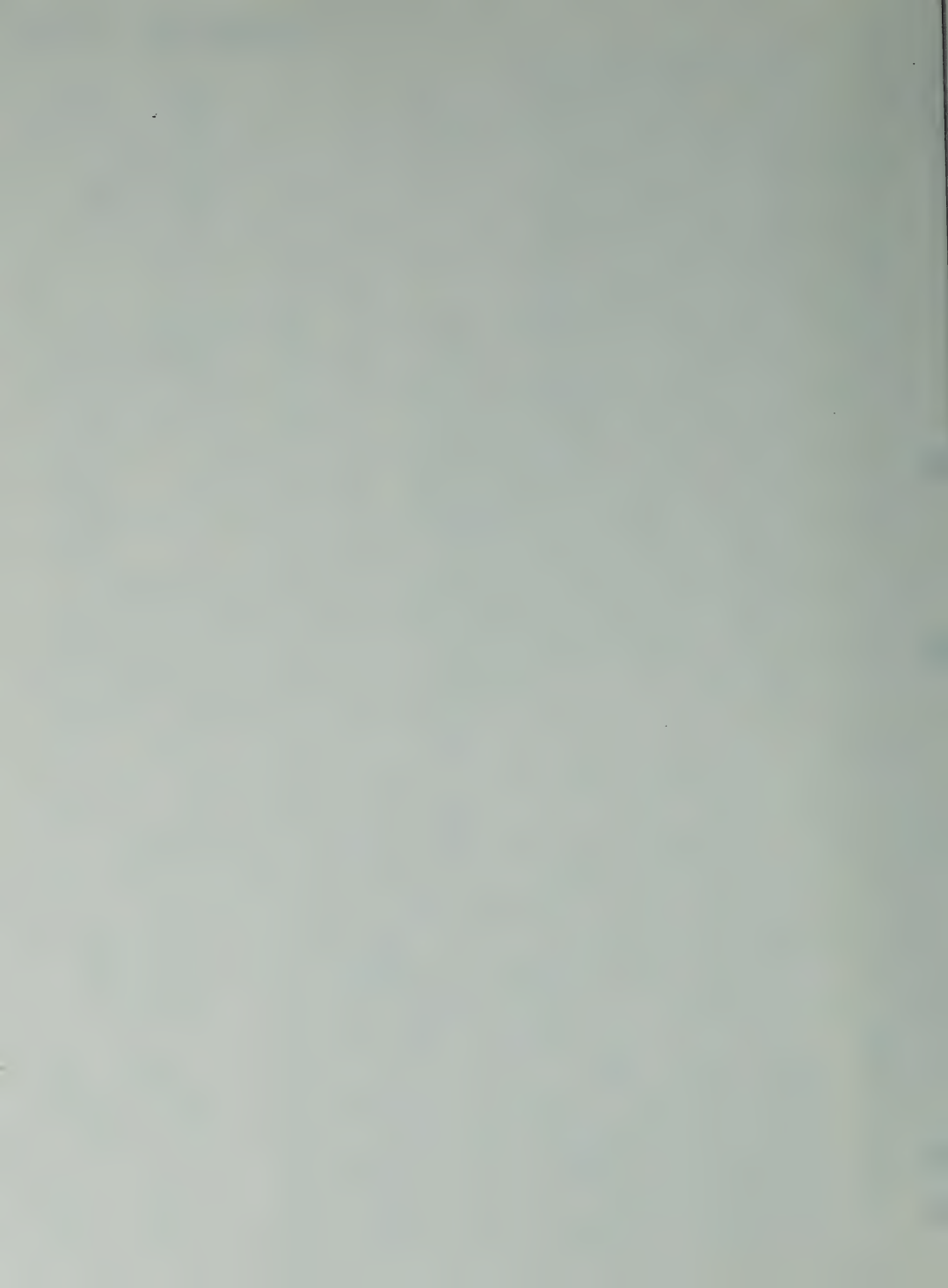


<Attachment method of T1, T2>



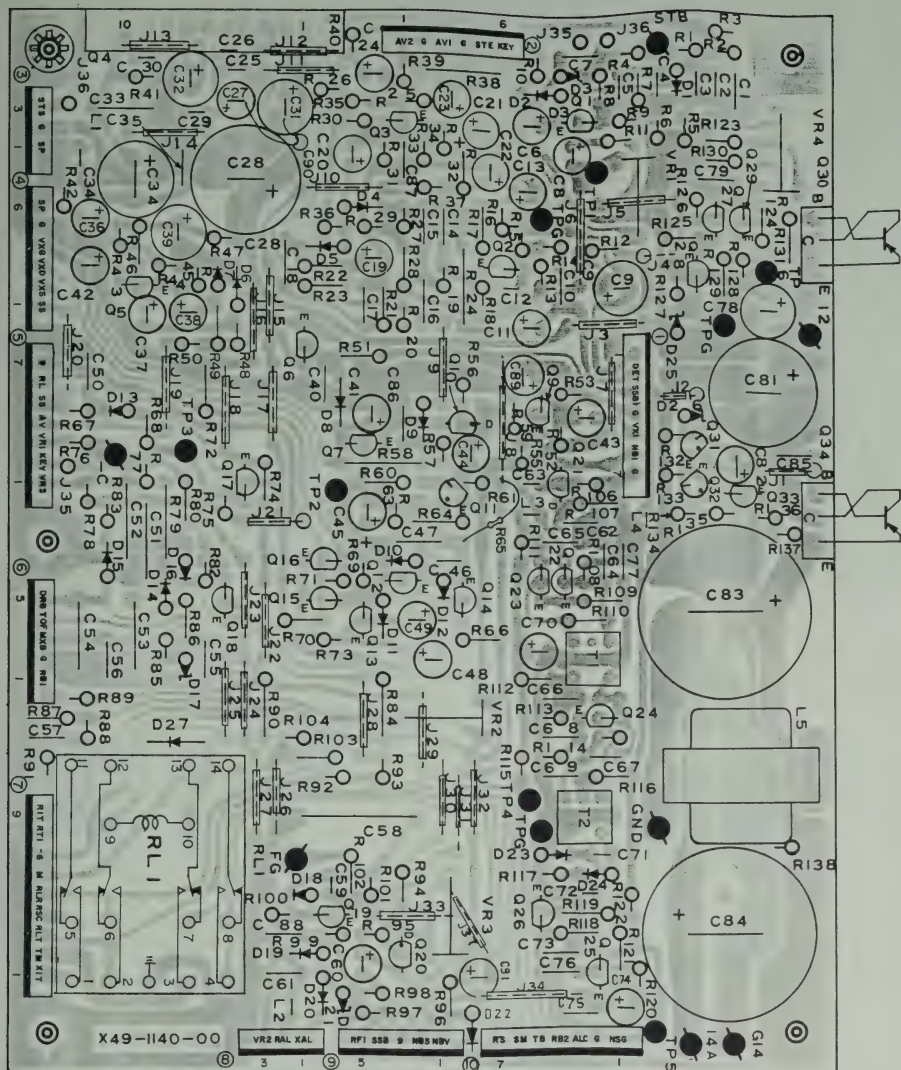
- Q1 6.7 3SK73 (GR)
- Q2~4 2SK125
- D1 1S1587
- D2,3 1S2588
- D4~10 1S1555





TS-830S PC BOARD VIEW

▼ AF UNIT (X49-1140-00)



Q1,5,6,7,11,12,14,16,18,26~29,31,32 2SC945(Q) or 2SC1815(Y) Q2,3 2SC2240(GR) Q4 HA1368R Q9,13,33 2SA1015(Y) Q10 2SK30A(GR)
Q15,25 2SC1815(GR) Q17 2SA562(Y) Q19 2SC1515(K) Q20 2SK30A(O) Q21 2SK19(GR) Q22~24 2SC460(B) Q30,34 2SA473(Y)
D1,2,4~10,12,13,16,18,27 1S1555 D3,17,21 WZ-090 D11,23,24 1N60 D14,15,19,20 V06B D22 MV-13 D25 WZ-061 D26 XZ-090

2SA1015(Y)
2SC945(Q)
2SC1515(K)
2SC1815(GR), (Y)
2SC1959(Y)
2SC2240(A)

2SA562(Y)

2SC460(B)

2SA473(Y)

2SK19(GR)

2SK30A(GR),(O)

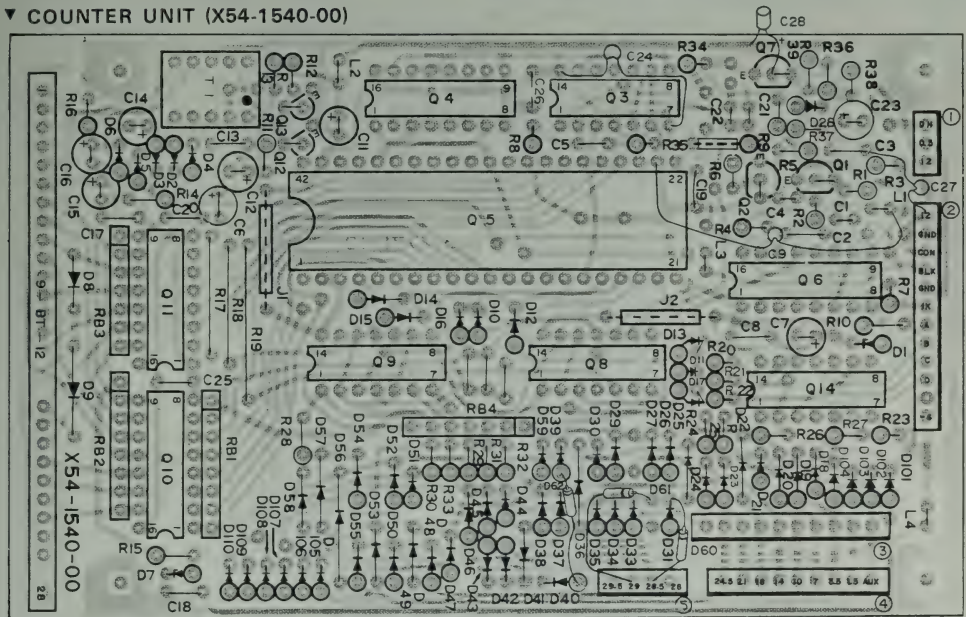
HA1368R

MV-13

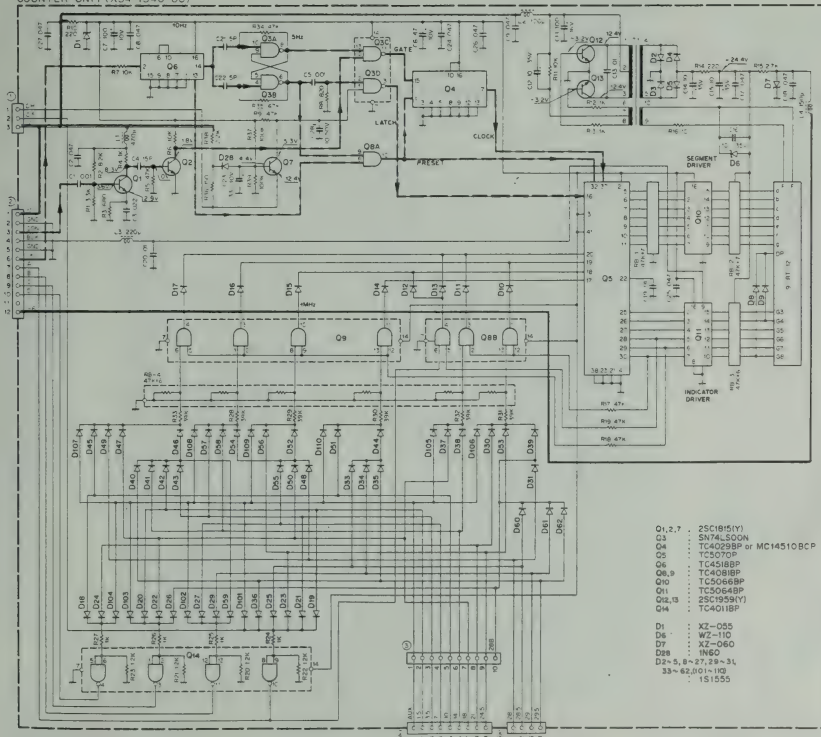


GREEN

▼ COUNTER UNIT (X54-1540-00)

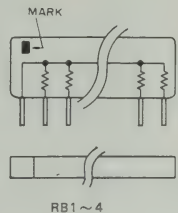


COUNTER UNIT (X54-1540-00)

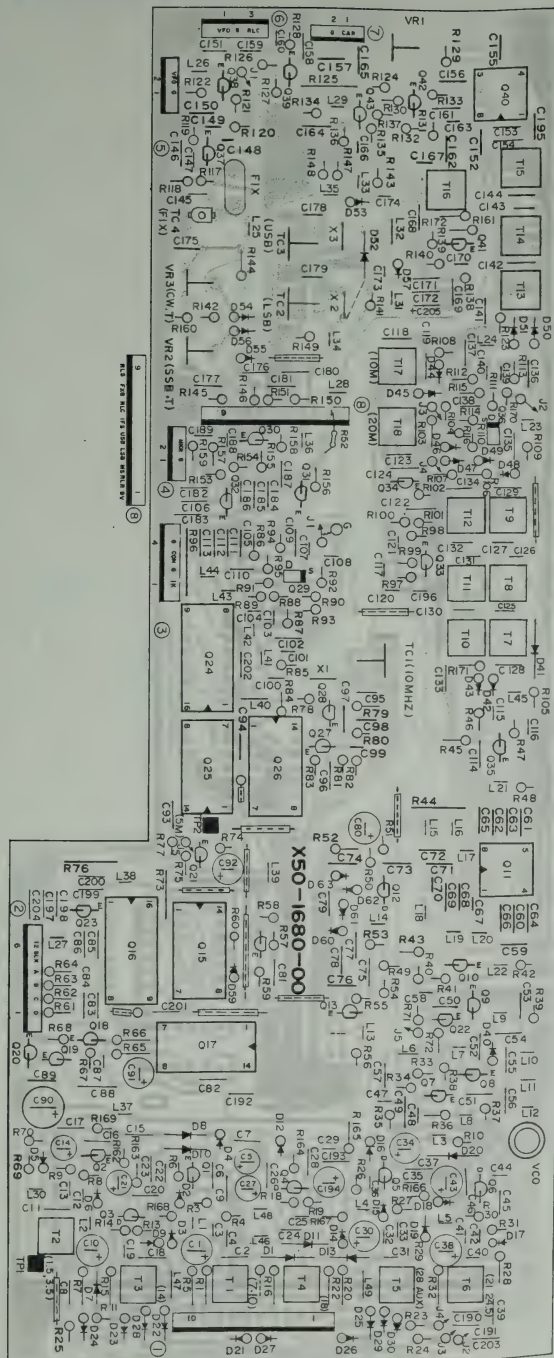


- O1,2,7 2SC1815(Y)
 Q3: SN74LS00N
 Q4 TC4029BP
 or MC14510BCP
 O5 TC5070P
 O6 TC4518BP
 O8,9 TC4081BP
 O10 TC5068BP
 O11 TC5064BP
 O12,13 2SC1959(Y)
 O14: TC4011BP

- D1: XZ-055
 D2~5,8~27,29~31,
 33~62 1S1555
 D6 WZ-110
 D7 XZ-060
 D28 1N60



RB1~4



25C1815 (BL, Y)

25C1923 (O)

25C1959 (Y)

25C460 (B)



25C460 (B)

3SK73 (GR)

25K19 (BL, Y)



Q1.2,10,35,41~43: 25C460(B) or 25C1675(L) Q3.4: 2SK19(GR) Q5.6,12: 2SK19(BL) Q7.30: 25C1923(O) Q8.9: 25C1959(Y)

Q11.40: SN16913P

Q13.14,21,22,27,28,32,37~39: 25C1815(Y) Q15: HD74LS00P or SN74LS00N or SN74LS163AN or HD74LS163P

Q17: MC4044P Q18~20: 25C1775

Q23: NJM78L05A Q24: TC4518BP Q29,36: 3SK73(GR) Q25,26: SN74LS00N or HD74LS00P Q31: 25C1815(BL) Q33,34: 25C460(B)

D11~57: 1SV564C D2,6,15,18,16: 1S2588 D3,7,14,19,21~30,46,47,52~56: 1S1555 D4,8,10,12,20,40~45,48~51,59: 1S1587

D9,11,13,17: 1SV53A D60~63: 1N60



TEST EQUIPMENT REQUIRED**1. VTVM or DVM**

- 1) Input resistance: More than 1 M Ω
- 2) Voltage range: 1.5 to 1000V AC/DC

NOTE:

A high-precision voltmeter may be used.
However, accurate readings can not be obtained for high-impedance circuits.

2. RF VTVM

- 1) Input impedance: 1 M Ω and less than 3 pF.
- 2) Voltage range: 10 mV to 300V
- 3) Frequency range: 50 MHz or greater

3. AF VTVM

- 1) Frequency range: 50 Hz to 10 kHz
- 2) Input impedance: 1 M Ω or greater
- 3) Voltage range: 10 mV to 30V

4. AF GENERATOR (AG)

- 1) Frequency range: 200 Hz to 5 kHz
- 2) Output: 2 mV~ 1V, low distortion

5. AF DUMMY LOAD

- 1) Impedance: 8 Ω
- 2) Dissipation: 3W or greater

6. RF DUMMY LOAD

- 1) Impedance: 50 Ω
- 2) Dissipation: 100W continuous or greater
- 3) Frequency limits: 1.8 to 30 MHz

7. OSCILLOSCOPE

Requires high sensitivity and external synchronization capability.

8. SWEEP GENERATOR

- 1) Center frequency: 8 to 40 MHz
- 2) Sweep bandwidth: Maximum ± 16 MHz
- 3) Output voltage: More than 0.1V

9. STANDARD SIGNAL GENERATOR (SSG)

- 1) Frequency range: 1.8 to 30 MHz
- 2) Output: -20 dB/0.1 μ V~120 dB/1V
- 3) Output Z= 50 Ω
Generator must be frequency stable

10. FREQUENCY COUNTER

- 1) Minimum input voltage: 50 mV
- 2) Frequency range: Greater than 50 MHz

11. NOISE GENERATOR

Must generate ignition-like noise containing harmonics beyond 30 MHz.

12. Spectrum analyzer

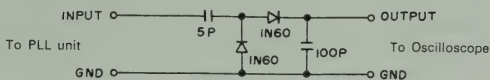
- 1) Frequency range: 100 kHz to 110 MHz
- 2) Bandwidth: 1 kHz to 3 MHz

NOTE:

R-1000 receiver may be used.

13. Detector

For adjustment of PLL unit BPF.

**14. Directional coupler****15. 8P DIN connector**

Refer to Fig. 11 on page 41

16. FIX-CH Adjusting crystal element

- 1) 5.750 MHz (center 250 kHz)

PREPARATION

Unless otherwise specified, set the controls as follows

Rear panel

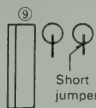
SG SW OFF

Front panel

MODE	TUNE	TONE	MAX
CAR	MIN	RF GAIN	MAX
VOX	OFF	PROC	OFF
METER	IP	BAND	1.5
RIT/XIT	CENTERED	DH	OFF
HEATER	OFF	MONI	OFF
FIX	OFF	RIT	OFF
RF ATT	OFF	NOTCH	OFF
XIT	OFF	VBT	MAX
IF SHIFT	CENTERED	AF GAIN	MIN

Item	Condition		Measurement			Adjustment			Specification	Remarks
			Test equipment	Unit	Terminal	Unit	Parts	Method		
1. 9V AVR and 3.6V adjustment			DVM	AF	TP-6 Pin 5, connector (3)	AF	VR4 VR3	9V 3.6V	9V \pm 0.05V 3.6V \pm 0.05V	RF1
2. Base current adjustment	SG SW MODE METER HEATER FIX DRIVE BIAS VR	ON USB IP ON ON Fully clockwise Rotate	IP meter							
	STBY REC. SG SW OFF							*After checking the above.	Set to 60 mA	
3. Carrier adjustment ① NOTE: When making any one of the adjustments in items 3., 4., 5., or 6., observe the listed order of adjustment.	IF SHIFT VBT MODE	Centered Fully clockwise USB	RF VTVM	IF	TP3	PLL	NOTE: T16	0.3V	0.3V \pm 1dB	NOTE: The slug of T16 should be turned counterclockwise for this adjustment after the peak point is determined.
	MODE STBY	LSB REC ↓ SEND	f. counter				VR2	Obtain the same frequency for both transmission and reception	\pm 20Hz	
	STBY	REC					TC2	8828.50kHz		
	MODE	USB					TC3	8831.50kHz		
	MODE STBY	CW SEND					VR3	8830.70kHz		
	STBY	REC								
4. IF SHIFT check	MODE VBT	LSB Fully clockwise Rotate the IF SHIFT and check the variation	f. counter	IF	TP3				Set IF SHIFT to center. More than +1.1 kHz Less than -1.1 kHz	
	MODE	USB: Same as above								
	STBY	SEND							8831.50 kHz	USB
	Regardless of the IF SHIFT setting								8828.50 kHz	LSB
	STBY	REC								
	IF SHIFT VBT	Centered Fully counter-clockwise							Reference the above frequency Less than -1.1 kHz	USB, LSB
5. VBT adjustment and check	VBT	Fully clockwise	RF VTVM	IF	TP1	IF	NOTE: L16	1.0V	1.0V \pm 1dB	NOTE: The slug of L16 should be turned counterclockwise for this adjustment after the peak point is determined
			F. counter							
	VBT	Fully counterclockwise					TC2	8375.00kHz		
									Reference the above frequency Less than -2.2 kHz	
	STBY	SEND Regardless of VBT setting							Reference the above frequency Less than \pm 70 Hz	
	STBY	REC								

Item	Condition	Measurement			Adjustment			Specification	Remarks
		Test equipment	Unit	Terminal	Unit	Parts	Method		
6. Carrier adjustment(2)	IF SHIFT Centered Fully clockwise USB	RF VTVM	IF		IF	L19 L20	Max. level		
						NOTE: L20			NOTE: The slug of L20 should be adjusted while it is turned counterclockwise
	MODE LSB							0.3V ± 1 dB	If the voltage is outside the specified limit, adjust L19 and L20 until the voltage is 0.3V for both USB and LSB.
	MODE USB	F.counter						456.5 kHz	Reference value
	MODE LSB							453.5 kHz	
	MODE CW							455.7 kHz	
	STBY SEND								
	STBY REC								
7. VFO, RIT, FIX CH check and adjustment	Scale: 0 ~ 500								Should rotate smoothly and have no abnormal noise.
	Rear panel VFO	SG SW OFF 250	RF VTVM	PLL	Pin 2, connector (3, 1P (GND))			200mV ± 1 dB	
	MODE STBY	CW SEND	F.counter	Rear panel	EXT VFO 1P 7P (GND)				
	Set the VFO dial to 50. At this time set the CAL control to the index.		F.counter	Rear panel	EXT VFO	VFO	L3	5550.00 kHz ± 200 Hz	Repeat the adjustment several times until the frequency is within specification.
	Set the VFO dial to approx. 450. Set the CAL control dial calibrated under this VFO setting exactly to the index.				1P 7P (GND)		TC1	5950.00 kHz ± 200 Hz	
	Tune in 5550.00 kHz with the main tuning knob.								
	Under the above condition, set the CAL control to the index. Turn the main tuning, and set the calibrated CAL control to the index in the order of 0, 100, 200, 300, 400, and 500 to check frequency deviation at each 100 kHz point.								
	Set the CAL control back to 250 under the above condition (do not turn excessively), then further set back the CAL control to 0 with respect to the frequency at 250 to check the difference from the reference frequency.								



Short jumper



The 50 kHz point on the dial scale must be aligned to the index.



0	5.5 MHz
100	5.6
200	5.7
300	5.8
400	5.9
500	6.0


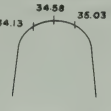
Within ± 2 kHz

Check the scale (Electrically)

Less than 400Hz

Backlash

Item	Condition	Measurement			Adjustment			Specification	Remarks
		Test equipment	Unit	Terminal	Unit	Parts	Method		
	Set point 0 on the dial scale and the CAL control to the index. When the CAL control calibrated at each 100 kHz is set at the index, check the deviation of the dial scale at each point.							Should come in contact with the pointer.	Check the scale (mechanically)
	RIT: Centered RIT switch: ON Set the VFO main control to 5750.000 kHz				AF	VR2	5750.000 kHz		
	Check that the same frequency is obtained when the RIT switch is turned ON and OFF.							Less than 50 Hz	
	RIT switch: ON VFO: 250 RIT control: fully counter-clockwise (⊖ position) RIT control: fully clockwise (⊕ position)							-1.5kHz or less + 1.5kHz or more Reference to the center (φ) position of the RIT control.	
	RIT OFF								
	Install the 5750 kHz quartz crystal into the socket on the PLL unit.				PLL	TC4	Centered	Normal oscillation must be obtained.	
							TC 4 Variable	Variable range: ±250 Hz	
	FIX ON	RF VTVM					Centered	Output level 0.2V±2 dB	
8. Counter reference oscillator adjustment	Remove the quartz crystal from its socket. FIX OFF								
		F.counter	PLL	TP2	PLL	TC1	1000.000 kHz		
	9. VCO adjustment and check	F.counter DVM	RF PLL	TP3 TP1					
	Check the frequencies at the following points and adjust coils until those given in brackets are obtained.								
		Adjusting point							
		VFO BAND	0	250	500	Unit	Part		
		1.5	10.33 MHz	10.58 MHz (4.0V)	10.83 MHz	PLL	T2		
		3.5	12.33	12.58	12.83				
		7	15.83	16.08 (4.75)	16.33		T1		
		10	18.83	19.08	19.33				
		14	22.83	23.08 (4.5)	23.33		T3		
		18	26.83	27.08 (5.0)	27.33		T4		
		21	29.83	30.08 (3.5)	30.33				
		24.5	33.33	33.58	33.83		T6		
		28	36.83	37.08	37.33		T5		
		28.5	37.33	37.58	37.83 (4.75)				
		29	37.83	38.08	38.33				
		29.5	38.33	38.58	38.83				
	Check the level at each of the above points.	RF VTVM	RF	TP3				1V ⁺³ dB -2	
	Both edges of the VFO frequency in each band							Display should indicate.	
10. BPF-A	Disconnect connectors (1 and (3) on the PLL unit. Connect the cathode of D24 (1S1555) to the jumper wire next to R44 with a clip lead. Connect the sweep generator RF output to the EXT-VFO connector.	Sweep generator, Oscilloscope	PLL	Q35 (E)	PLL	T13 T14 T15	Adjust until the response shown to the right is obtained.		

Item	Condition	Measurement			Adjustment			Specification	Remarks
		Test equipment	Unit	Terminal	Unit	Parts	Method		
11. BPF-B adjustment	Disconnect connectors ① and ③ on the PLL unit. Connect the cathode of D27 (1S1555) to the jumper wire next to R44 with a clip lead. Connect the cathode of D50 (1S1587) to the jumper wire next to TC1 with a clip lead. Connect the RF output of the sweep generator to R111 (100Ω) via a 15PF capacitor.	Sweep generator Oscilloscope	PLL	Q35 ⑥	PLL	T7 T8 T9 T17	Adjust T7 ~T9 until the response shown at the right is obtained. Then adjust T17 for maximum amplitude.		
12. BPF-C adjustment	Disconnect connectors ① and ③ on the PLL unit. Connect the cathode of D26 (1S1555) to the jumper wire next to R44 with a clip lead. Connect the cathode of D50 (1S1587) to the jumper wire next to TC1 with a clip lead.					T10 T11 T12 T18	Adjust T10 through T12 until the band response shown at right is obtained. Then adjust T18 for maximum amplitude.		
13. VFO, MIX spurious adjustment NOTE: This adjustment should be done after completing the adjustment (or check) of BPF-A.	Disconnect connector ① on the PLL unit. Connect the cathode of D24 (1S1555) to the jumper wire next to R44 with a clip lead. VFO 250 MODE CW	Spectrum analyzer (Monitor receiver)				VR1	Minimum (14.99 MHz)	Less than -55dB	
14. Carrier balance adjustment	IF SHIFT RF GAIN Centered Fully counter-clockwise	RF VTVM	Rear panel	IF OUT 2	IF	TC1	Minimum		
15. IF AMP adjustment	BAND: 1.5 DRIVE: 400 RF GAIN: 12:00 IF SHIFT: fully clockwise IF SHIFT: centered RF ATT: OFF MODE: USB AGC: OFF NOTCH SW: OFF NB SW: OFF	AF VTVM Oscilloscope	Rear panel	EXT. SP	RF	ANT coil 1.8 RF coil 1.8 T2	Max. audio output		
	VBT: fully clockwise TONE: fully clockwise SG SW: OFF Connect the SSG output (1.9 MHz, 40 dB) to the antenna terminal. While adjusting, gradually decrease the SSG output level down to -6 dB.				IF	L2 L3 L4 L5 L6 L7 L9 L11			
16. Coil pack adjustment	Connect the SSG (40 dB) to the ANT terminal. DRIVE 12:00 While adjusting, gradually decrease the SSG output level down to -6 dB. Adjust at the following points:	AF VTVM Oscilloscope	Rear panel	EXT. SP	RF	ANT coil RF coil	Max. audio output		
	No. BAND VFO f								
	1 1.5 400 1.9 MHz						1.8		
	2 3.5 250 3.75						3.5		
	3 7 150 7.15						7		
	4 10 125 10.125						10		
	5 14 175 14.175						14		
	6 18 125 18.125						18		
	7 21 225 21.225						21		
	8 24.5 450 24.950						24		
	9 28.5 300 28.800						28		

Item	Condition	Measurement			Adjustment			Specification	Remarks
		Test equipment	Unit	Terminal	Unit	Parts	Method		
17. ALC "0" adjustment	METER ALC				IF	VR6	ALC meter starting point		
18. Generator, Drive coil adjustment	CAL ON CAR VR Centered HEATER ON MODE CW METER ALC SG SW OFF RF ATT ON				RF	DRIVE coil	Max. ALC meter reading		
	Receive the marker frequency in the following bands and obtain the peak level by adjusting the DRIVE control. Set the STBY switch to SEND and adjust each coil.								
	BAND VFO								
	1.5 400					1.8			
	3.5 250					3.5			
	7 150					7			
	(10) (125)					10			
	14 175					14			
	(18) (125)					18			
	21 225					21			
	(24.5) (450)					24.5			
	28.5 300					28			
	BAND 14, VFO 175 Adjust the CAR control until the ALC meter reads maximum.				RF IF	T4 L24 L25 L28 L29	Max. ALC meter reading		
	STBY REC								
19. MIX balance adjustment	RF ATT ON BAND 1.5 VFO 0	Oscilloscope	Rear panel	IF OUT 1	RF	VR1	Minimum		
20. IF trap adjustment	BAND: Between 1.5 and Aux. Connect the SSG (8.83 MHz, 80 dB) to the ANT terminal.	Oscilloscope AF VTVM	Rear panel	EXT. SP	RF	L22 L3 L4	Minimum Adjust in the order of L22 ~ L4.		Preset the slugs of L3 and L4 fully clockwise.
21. S meter adjustment	AGC OFF				IF	VR2	Set to the deflection starting point		
	BAND 14 VFO 175 AGC FAST Connect the SSG (14.174 MHz, 8 dB) to the ANT terminal.	Oscilloscope AF VTVM	Rear panel	EXT. SP			Adjust the DRIVE control for maximum AF output.		
	SSG output: 40 dB * Repeat S-1, 9 adjustment several times.				IF	L9	Turn the coil slug counterclockwise until S-1 is obtained.		
22. NB adjustment	NB LEVEL: fully counterclockwise BAND 14, VFO: 175 Connect the SSG output (14.175 MHz, 80 dB) to the ANT terminal.	DVM	AF	TP4	AF	T1 T2	Minimum		
	SSG output: 20 dB Adjust as described above.								
	AGC FAST Disconnect the SSG output from the ANT terminal, and connect the noise generator output in its place. Set the noise generator output level to S5 ~ 7.	Speaker	Rear panel	EXT. SP					

(): See note Before adjustment
Note:

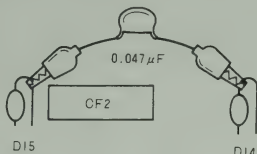
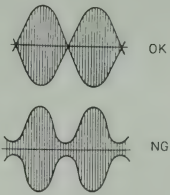
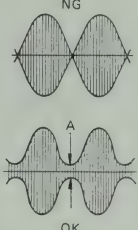
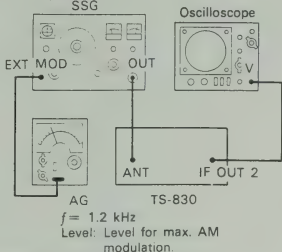
TRANSMITTING ON WARC BANDS

As supplied, the TS-830S will receive but not transmit on the 3 new WARC bands. If transmit capability is desired, a minor wiring change is required.

1. For all 3 bands: Break the line between the RF unit X44-1360-00, connector #6, Pin #1 (TOF terminal) and AF unit X49-1140-00, connector #6, Pin #4 (TOF terminal).

2. Or, for individual Bands: On the RF unit X44-1360-00.

Band	Remove (or Cut) Part
10 MHz	D4
18 MHz	D5
24.5 MHz	D6

Item :	Condition	Measurement			Adjustment			Specification	Remarks
		Test equipment	Unit	Terminal	Unit	Parts	Method		
NB adjustment	NB ON							The NB must provide adequate effect.	
					If adequate effect is not obtained, repeat the adjustment several times.				
	Reduce the noise generator output level to below the threshold of sensitivity. Turn the NB LEVEL control fully clockwise.							Noise must be blanked.	
	NB OFF								
23. VBT adjustment with VBT-1	MODE IF SHIFT VBT	CW/N Centered Fully clockwise	Oscilloscope VBT-1	IF OUT 1, 2					This adjustment requires the use of the VBT-1. If the VBT-1 is unavailable, this adjustment will be difficult.
	Disconnect connector ① on the IF unit. Connect the VBT-1 output to IF OUT 1, and connect the oscilloscope to IF OUT 2. Connect a 0.047 μ F capacitor across D14 and D15 on the IF unit. Set the filter switching terminal connection to CW3. Adjust the control on the VBT-1 until the waveform shown at right is observed on the oscilloscope.								
	Set the MODE switch to CW.W.			IF	TC2	Adjust until the waveform shown in the preceding item is obtained.			
	Remove 0.047 μ F capacitor. Reconnect connector ①.								
23'. VBT adjustment with SSG, AG and Oscilloscope	BAND: 1.5 MODE: CW/N IF SHIFT: Centered VBT: Fully clockwise	SSG, AG, Oscilloscope	Rear panel	IF OUT 2	IF	TC2	Adjust TC2 until part A becomes null. SSG		
	Disconnect connector ④ on the IF unit. Connect a 0.047 μ F capacitor across D14 and D15 on the IF unit. Filter SW terminal: CW3. Receive SSG signal (1.9 MHz, 60 dB), and set the main tuning to obtain waveform shown at right. MODE: CW.W								
	Filter SW terminal: CW1								
24. NOTCH adjustment	NOTCH OFF BAND 1.5 VFO 400 AGC FAST NOTCH Centered Turn VR1 on the IF unit fully counterclockwise. Couple the SSG output (1.9 MHz, 40 dB) to the ANT terminal.	Oscilloscope	Rear panel	EXT. SP			Set beat frequency to 1500 Hz and audio level 0.63V/8 Ω .		
	NOTCH ON				IF	L10 VR1	Min. audio level	*Repeat a few times	
	Rotate NOTCH.							The dip point should be located somewhere between 11:00 to 1:00, and audio level 0.1V/8 Ω or less	
	NOTCH OFF								

Item	Condition	Measurement			Adjustment			Specification	Remarks
		Test equipment	Unit	Terminal	Unit	Parts	Method		
25. Neutralization trimmer adjustment	BAND 28, +0.5 SHIFT ON VFO 300 SG SW ON STBY SEND Tune the DRIVE, PLATE and LOAD	Power meter Sync'd scope	Rear panel	ANT					
	SG SW OFF							The output must be 0.	
	Set the ALC to maximum with the DRIVE control. Increase oscilloscope sensitivity.					Neutrazation trimmer	Minimum		
	Reduce oscilloscope sensitivity (5V/div.). SG SW ON							The normal power must be obtained. The signal waveform must be normal.	
26. Side tone, semi-break-in function adjustment	Connect a power meter to the ANT terminal. Plug key into the rear Key jack to transmit in any band.	Oscilloscope AF VTVM	Rear panel	EXT. SP	AF	VR1	0.63V/8Ω		
	Operate the key							The power must be intermittent.	
	STBY REC VOX ON Operated the key.							Semi-break-in operation should be available.	
27. Transmission spurious adjustment	Ground pin 4 of connector ⑥ on the AF unit. Set the BAND switch to 18, and VFO to 125. Connect a power meter to the ANT terminal. Set the STBY switch to SEND and tune up.	Spectrum analyzer (receive 17.66MHz with a monitor receiver.)	Rear panel	ANT	RF	VR2	Minimum (Monitor level)	Less than -40 dB	
	STBY REC								
28. RF meter adjustment	BAND 14 VFO 175 METER RF Connect a power meter to the ANT terminal. Tune up.				Rear panel	RF VOLT	Set the IP meter reading to 250.		
	STBY REC								
29. Carrier suppression adjustment	BAND 14 VFO 175 MODE CW Connect power meter to ANT. STBY SEND Tune up. MODE USB	Sync'ro scope	Rear panel	ANT	IF	VR4 TC3	Adjust alternately until the minimum point is obtained.		
	MODE LSB ↓ USB						Adjust until no level difference exists between LSB and USB.		
	MODE CW Sync'd scope level calibration								
	MODE USB, LSB							Less than: -50 dB	Compare with CW
	STBY REC								
30. SSB frequency response adjustment	BAND 14 VFO 175 MODE USB Connect the AG (1500Hz, 7mV) to the MIC input connector. STBY SEND Tune up. Set to 50W with MIC GAIN control.	Power meter Sync'd scope	Rear panel	ANT					

ADJUSTMENTS

Item	Condition	Measurement			Adjustment			Specification	Remarks
		Test equipment	Unit	Terminal	Unit	Parts	Method		
	AG 300Hz ± 2700Hz				PLL	TC3	Adjust until the same level is obtained for both 300 Hz and 2700Hz (equal audio rolloff).		
	MODE LSB same as above					TC2			
	AG 400Hz AG 2600 Hz							More than 1/2 with respect to the 1500Hz signal level observed on the scope.	
	After completing the above adjustment, readjust the carrier suppression (see item 29.)				IF	VR4 TC3	Minimum	Less than -50dB	
31. ALC adjustment	BAND 14, VFO 175 MIC GAIN MIN METER ALC Connect power meter to the ANT terminal. STBY SEND				(When misaligned.) IF	VR6	Set to the deflection start point.	The ALC meter must be aligned to its exact zero point.	
	Connect an AG output (1.5 kHz, 5 mV) to the MIC jack. Set the MIC GAIN control to maximum. Tune up. Reduce the power by 5 watts with the MIC GAIN control.							No ALC deflection	
	Increase the AG output to 10 mV.				IF	VR7	Obtain the maximum ALC on-scale reading.		
	Repeat the above three adjustment steps several times.								
32. Speech processor adjustment	SG SW OFF MODE USB METER COMP MIC GAIN MIN PROC ON Connect the AG output (1.5 kHz, 5 mV) to the MIC jack. Set the STBY switch to SEND. Adjust the COMP LEVEL control until the meter reading is obtained.				IF	L26	Max. meter reading		
	Set VR5 on the IF unit fully clockwise. Adjust the COMP LEVEL control until the meter indicates S-1. Set the AG output to 50 mV.					VR5	Meter indicator 20 dB		
	METER ALC Adjust the MIC GAIN control until the maximum meter reading is obtained.					L27	Max. meter reading		
	Set the PROC to OFF and the COMP LEVEL control to maximum. Set the AG output to 10 mV. Adjust the MIC GAIN control until the meter indicates the maximum on-scale ALC reading. Set the PROC to ON.					L27	Adjust until the same meter reading is obtained (MAX ALC on-scale).	MIC input providing the same ALC meter reading: 10mV ± 3 dB	NOTE: L27 should be adjusted while it is turned counterclockwise.
	STBY REC								
33. Monitor level adjustment	BAND 14 VFO 175 AGC FAST CAL ON Set the marker level to 0.63V with the AF GAIN control.	Oscilloscope	Rear panel	EXT. SP					

Item	Condition	Measurement			Adjustment			Specification	Remarks
		Test equipment	Unit	Terminal	Unit	Parts	Method		
	Connect a power meter to the ANT terminal. SG SW ON STBY SEND Tune up MODE USB Connect the AG (1 kHz, 10 mV) to the MIC jack. METER ALC Deflect ALC meter by MIC GAIN control. MONI ON				IF	VR8	Monitor output 0.63V/8Ω.		
	Disconnect AG. AF GAIN MAX.							Less than 8mV/8Ω	Monitor hum
	MONI OFF, STBY REC								

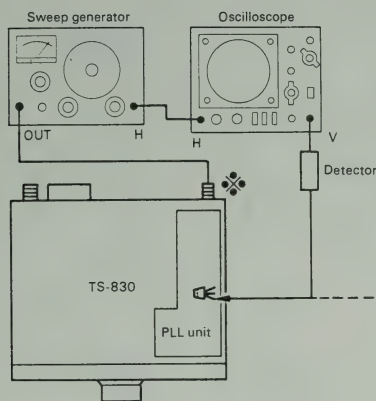


Fig. 9
(10) BPF-A, (11) BPF-B, (12) BPF-C
(13) VFO MIX SPURIOUS

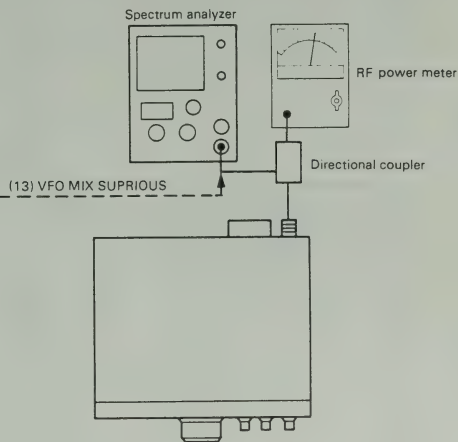
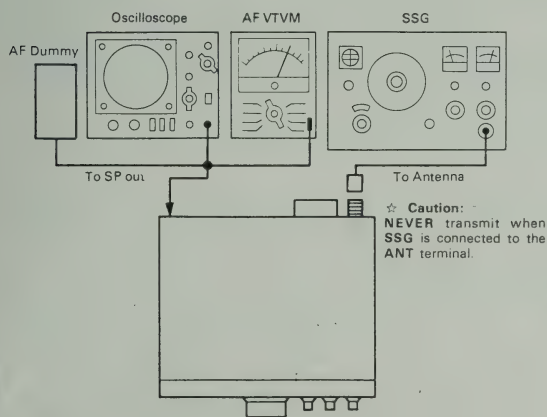


Fig. 10 (27) TX SPURIOUS



☆ Caution: NEVER transmit when SSG is connected to the ANT terminal.

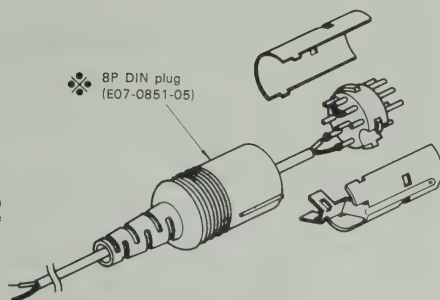
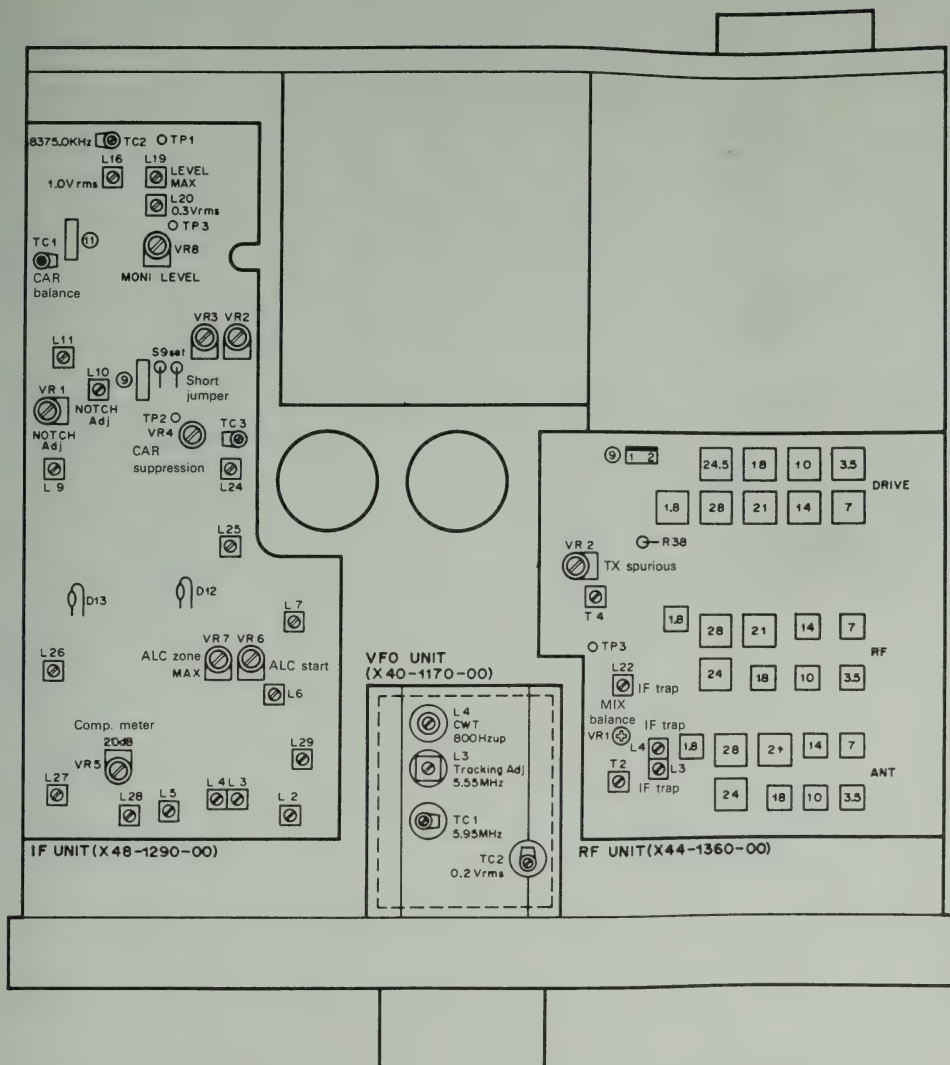


Fig. 11 8P DIN connector

Fig. 12 (15) IF AMP, (16) COIL PACK, (20) IF TRAP,

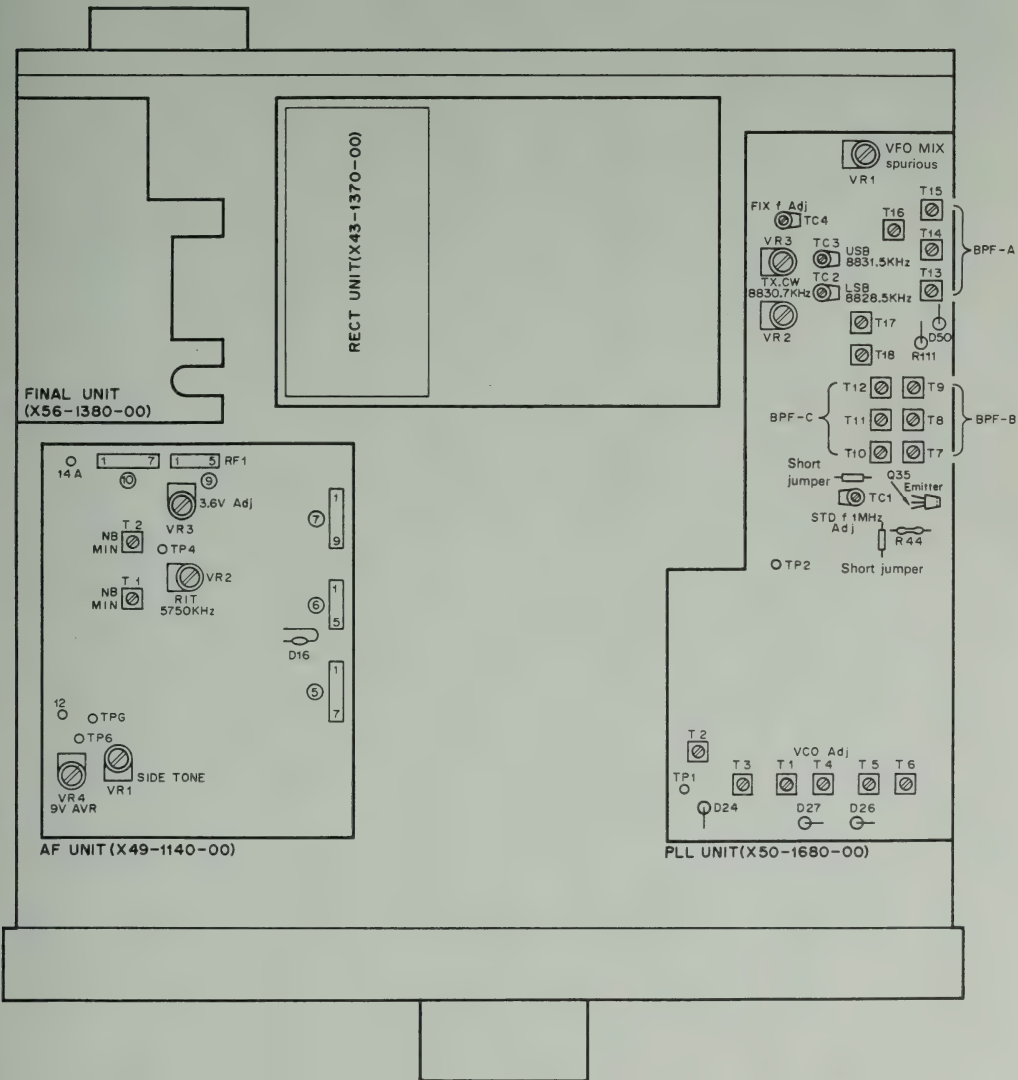
▼ TOP VIEW



LOCATION OF ADJUSTMENTS

TS-830S

▼ BOTTOM VIEW





1. The figures shown are signal generator output required for a constant audio output with a constant AF gain control setting and AGC SW OFF. Set the AF gain control for 0.63/8 Ω 150 mW audio output 0 dB signal generator input at 14.2 MHz.
2. To inject signal generator output connect a 0.01 μ F 500V capacitor between the signal generator and the check point.
3. To check the level at point a, the secondary ANT coil is grounded.



1. Levels are measured at 14.2 MHz in the CW MODE and SG SW OFF. Carrier level is adjusted until the meter indicates the maximum on-scale ALC reading. All voltage measurements are read from an RF VTVM.
3. A probe with a capacitance of less than 3PF should be used, and the ground should be made near the point of measurement.

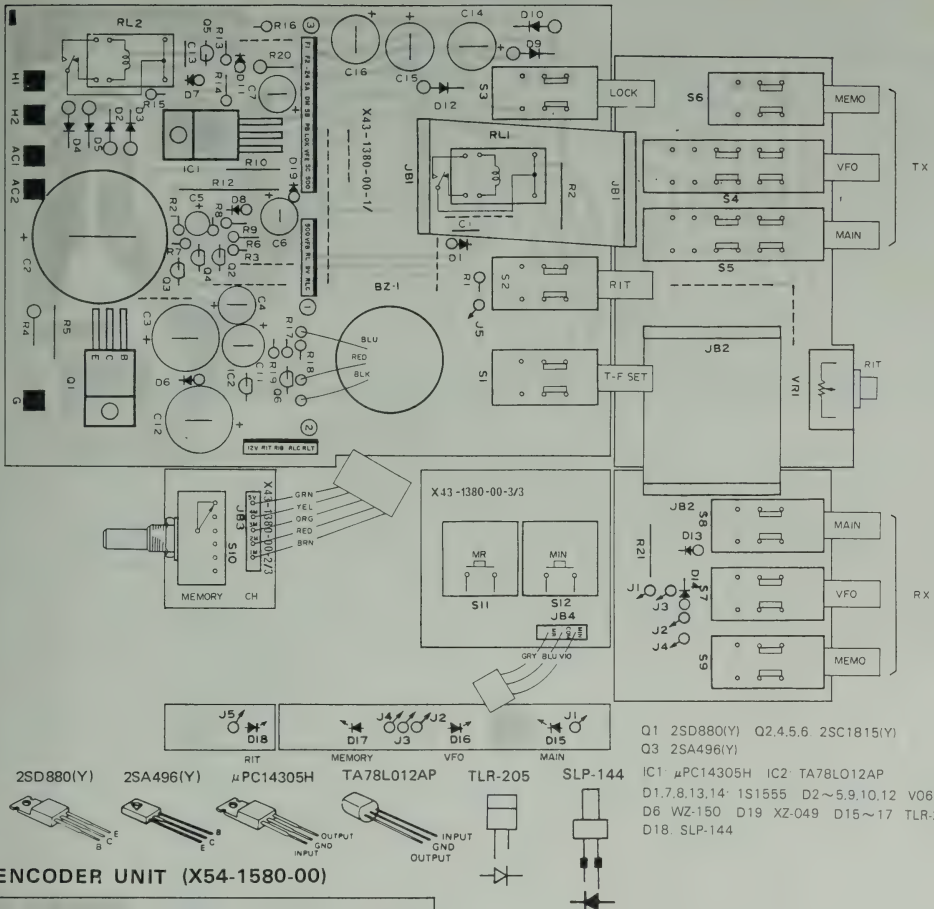
Attachment direction of
Q5 3SK73(GR)

A diagram of a 9-pin D-sub connector. It shows a rectangular housing with a D-shaped notch on the top edge. Nine pins are visible protruding from the bottom edge. The pins are numbered 1 through 9 from left to right. Pin 1 is the leftmost pin, and pin 9 is the rightmost pin.

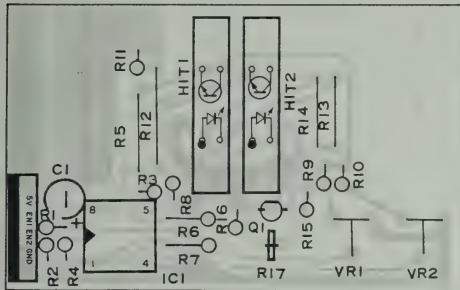
$$\frac{1}{2}$$

VFO-230

▼ POWER SUPPLY UNIT (X43-1380-00)

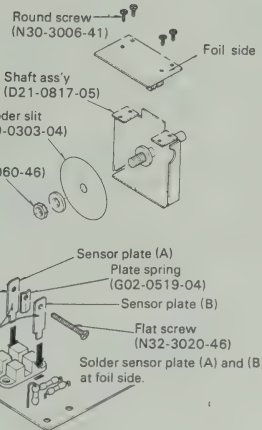


▼ ENCODER UNIT (X54-1580-00)



Max. Rating

V _R	I _F	P _D	I _C	V _{CE(sat)}	V _{CE(sat)}	P _C	T _{amb}
3V	50mA	75mW	20mA	30V	5V	100mW	-25 ~ +85°C



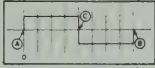
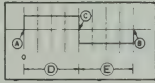
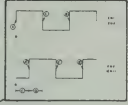
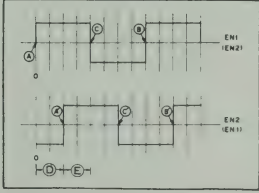
ADJUSTMENTS

Item	Condition	Measurement			Adjustment			Specification	Remarks
		Test equipment	Unit	Terminal	Unit	Parts	Method		
Setting	VFO-230: Front panel • MEMORY CH : 1 • FUNCTION RECEIVE : VFO TRANSMIT : VFO • RIT : Centered • RIT SW : OFF • LOCK SW : OFF • T.F SET : OFF TS-830S • BAND : 14 • MODE : CW • POWER : ON • SG SW : rear panel : OFF • CAL SW : OFF								

Use an insulated tuning tool for adjusting trimmer capacitors, coil slugs, etc.

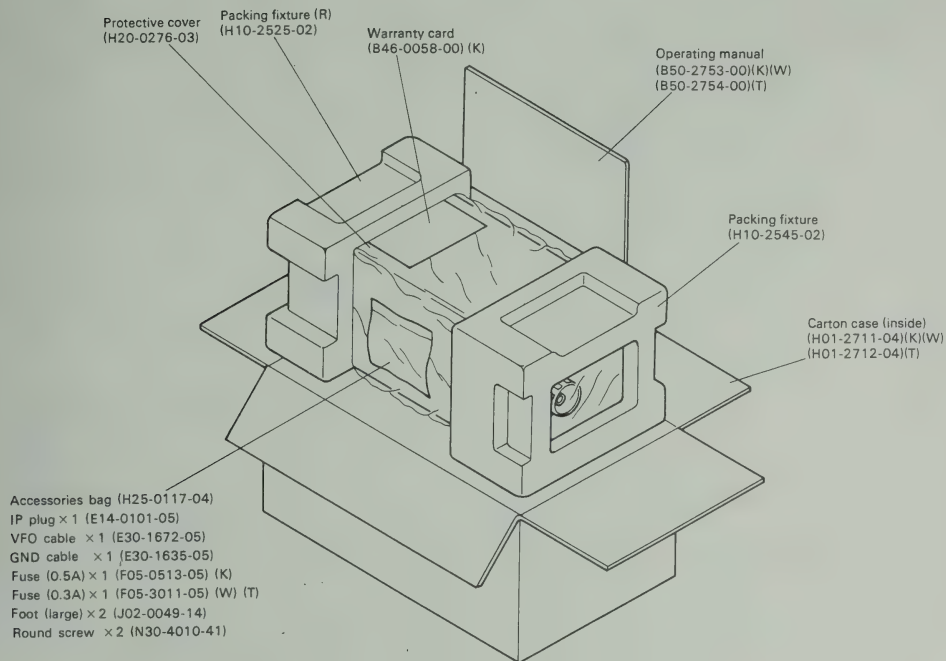
Item	Condition	Measurement			Adjustment			Specification	Remarks
		Test equipment	Unit	Terminal	Unit	Parts	Method		
1. Reference oscillator adjustment		F.counter	Digital	TP1	Digital	TC2		5.000MHz±5 Hz	
	[Calibration using the TS-830S] Interconnect the TS-830S ANT terminal and the VFO-230 CAL terminal. Set the FUNCTION (REC) switch on the VFO-230 to MAIN. With the TS-830, receive a beat frequency at around 14.000, then set the CAL switch to ON (a double beat will be obtained).						Obtain a zero beat between the double beats.		
	VFO-230: Set the FUNCTION (REC) switch to VFO. Turn the dial to check the following frequencies: L900.0, 0.0, 100.0, 200.0, 300.0, 400.0, 500.0						Check the frequency departure from the display on the TS-830.	Within ±100 Hz.	Check
2. PLL-1 adjustment	Turn the control until 19.9 is obtained on the display.	F.counter	Digital	TP4				798 kHz	Check
		DVM		TP3	Digital	L6	Set to 9.5V		
	Turn the control to scan the displayed frequency from 0.0 to 19.9.							2~9.5V±0.5V	Check
3. PLL-2 adjustment	Set the dial to display a frequency of 10.0.	RF VTVM	Digital	IC26 ②	Digital	T9 T10	Maximum (There should be a peak.)		
				IC26 ①		T1 T7 T8	Maximum (Broad at T1)		
				Q17 ⑧		T2 T3 T4	Maximum		
	Set the dial to a frequency display of 599.9.	DVM		TP2		T5	Set to 9.5V		
								2.0~9.5V±0.5V	Check
	Turn the dial to scan displayed frequency from L900.0 to 599.9.	F.counter	Rear panel	DIN connector ①				5.4~6.1 MHz	
		RF VTVM	Digital	Q17 ⑧	Digital	T4	Reset to maximum		

VFO-230

Item	Condition	Measurement			Adjustment			Specification	Remarks
		Test equipment	Unit	Terminal	Unit	Parts	Method		
4. RIT adjustment	RIT control: Centered DISPLAY: 500.0	F.counter	Digital	Cathode of D6	Digital	TC1	Adjust so that the frequency counter reading does not change at RIT SW ON/OFF.		
	RIT SW : ON RIT Control: Fully clockwise						Bracketed values are the TS-830S display indication.	More than 5,000.9 kHz (More than 14,500.9)	Check
	RIT SW : ON RIT Control: Fully counter-clockwise							Less than 4,999.1 kHz (Less than 14,499.1)	
	RIT SW : OFF							5,000.0 kHz (14,500.0)	
5. CW SHIFT adjustment	TS-830 MODE : TUN VFO-230 RIT : OFF FUNCTION (REC) : VFO	F.counter	Digital	Cathode of D6	Digital	VR1	TS-830 MODE: Adjust until a frequency 800 Hz higher than the CW frequency is obtained.	800Hz±50 Hz	
	TS-830 MODE : CW/N STBY SW : SEND VFO-230 RIT : OFF FUNCTION (TRA) : VFO						TS-830 STBY: The frequency is shifted by 800 Hz with respect to REC freq.		
	TS-830 STBY SW : REC								
6. Encoder adjustment	Remove the VFO knob and motor-drive the encoder at approx 300 rpm.	Oscilloscope	Digital	EN 1 terminal of Connectors ⑦ or ⑧					Point ③ may be located anywhere. When a motor is not available, manually turn the VFO control to check the duty ratio.
	EN 1 duty ratio adjustment: Turn a motor clockwise and counterclockwise.				Encoder	VR1			After adjusting with the VFO control turned clockwise, check that intervals ① and ⑤ are also identical when the VFO control is turned counterclockwise.
	EN 2 duty ratio adjustment: Turn a motor in the both direction.			EN2 terminal of Connectors ⑦ or ⑧		VR2	Adjust until intervals ① and ⑤ are equal to each other with point ③ placed at the center.		
	EN1-EN2 phase difference alignment: Same as above.			EN1 and EN2 terminals of Connectors ⑦ or ⑧		Phase adjustment screw		EN1 (EN2): Within 90 deg ±10%. (The difference between clockwise and counterclockwise rotation must also be within this specification.)	The phases of EN 1 and EN 2 may be replaced with each other as indicated in the brackets.
					Adjust until intervals ① and ⑤ are equal to each other (point A' on EN2 is located in the middle of points A and C on EN1.)				

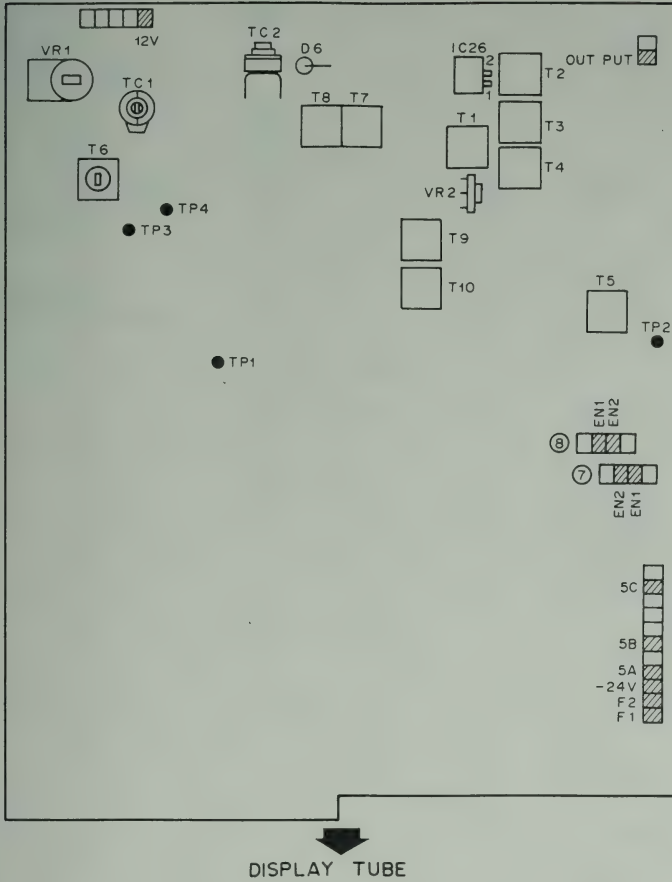
VFO-230

Item	Condition	Measurement			Adjustment			Specification	Remarks
		Test equipment	Unit	Terminal	Unit	Parts	Method		
7. Beat adjustment	TS-830 AGC : FAST RIT : OFF RF ATT : OFF VBT : NORM IF SHIFT : Centered MODE : USB VFO-230 FUNCTION (REC) : VFO DISPLAY (Dial): 20.0 Connect the SSG output to the ANT terminal on the TS-830S.						Adjust the SSG output frequency until a maximum S-meter reading is obtained on the TS-830S.		
	Adjust the SSG attenuator until the S meter on the TS-830S indicates 20 dB.								
	Set the VFO-230's dial to 20.8 (zero beat).	Obtain a beat from the TS-830			Digital	VR2	Adjust to the minimum beat level.		
	Turn the dial on the VFO-230 from 0.0 to around 50.0 while listening to the signals.							An abnormal beat should not be heard.	Check

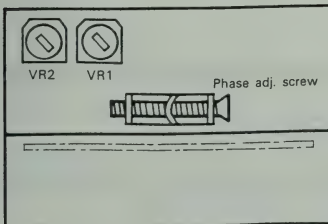


VFO-230

▼ DIGITAL UNIT (X54-1570-00)



▼ ENCODER UNIT (X54-1580-00)



SPECIFICATIONS

Speaker used: 12 cm dia.
Rated Input: 2 Watts
Impedance: 8 Ω
Frequency response: 100Hz to 5kHz.
Filter cut-off frequency,
 LOW: 400Hz, -3dB.
 HIGH 1: 3kHz, -3dB.
 HIGH 2: 1.5kHz, -3dB.
 HIGH 1 + HIGH 2: 1 kHz, -3dB.
Filter attenuation: -6dB/oct.
Dimensions:
 W 180 mm (7-1/16")
 H 133 mm (5-1/4")
 D 287 mm (11-5/16")
Net weight: 1.8 kg. (4.0 lbs.)
Accessories furnished: Speaker cord, 1 pc.
 (E14-0101-05)
 Extension foot, 2 pcs.
 (J02-0049-14)
 Screw, M4 x 12, 2 pcs.
 (N30-4012-41)
 1 pin plug, 2 pcs.
 (E20-1610-05)

PARTS LIST

Ref. No.	Parts No.	Description	Re- marks
	A01-0786-03	Case (upper)	
	A01-0789-02	Case (lower)	☆
	A20-2399-05	Panel (T)	☆
	A20-2400-05	Panel (K)(W)	☆
	B46-0058-00	Warranty card (K)	
	B50-2759-00	Operating manual (K)(W)	☆
	B50-2760-00	Operating manual (T)	☆
	E11-0404-05	Phone jack	
	E12-0001-05	Phone plug	
	E13-0361-05	3P Pin jack	
	E14-0101-05	1P Pin plug	
	E30-1610-05	Connector with lead	
	G53-0502-04	Packing	
	H01-2723-04	Carton (inside)(K)(W)	☆
	H01-2724-04	Carton case (inside)(T)	☆
	H10-2523-02	Packing fixture (F)	
	H10-2525-02	Packing fixture (R)	
	H20-0276-03	Protective cover	
	H25-0049-03	Protective bag	
	J02-0049-14	Foot	
	K29-0716-04	Push knob	
	L79-0443-25	Filter	
	RS14AB3D8R2J	Solid 8.2 Ω 2W	
	S40-2414-05	Push switch INPUT	
	S42-3401-05	Push switch LOW, HIGH 1, 2	
	T06-0011-05	Speaker	

A product of

TRIO-KENWOOD CORPORATION

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TRIO-KENWOOD COMMUNICATIONS, INC.

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TRIO-KENWOOD (AUSTRALIA) PTY. LTD.

30 Whiting Street, Artarmon, Sydney N.S.W. Australia 2064

SECTION 2. INSTALLATION

2.1 UNPACKING

Remove the TS-830S from its shipping container and packing material and examine it for visible damage. If the equipment has been damaged in shipment, notify the transportation company immediately. Save the boxes and packing material for future shipping or moving.

The following accessories should be included with the transceiver.

- | | |
|--|---|
| 1. Instruction Manual (B50-2738-00) | 1 |
| 2. Plastic Extension Feet with Screws
(J02-0049-14) | 2 |
| 3. Speaker Plug 1/8" (E12-0001-05) | 1 |
| 4. 7P DIN Plug (E07-0751-05) | 1 |
| 5. Fuse (6A) (F05-6021-05) | 1 |

2.2 OPERATING LOCATION

As with any solid state electronic equipment, the TS-830S should be kept from extremes of heat and humidity. Choose an operating location that is dry and cool, and avoid operating the transceiver in direct sunlight. Also, allow at least 3 inches clearance between the back of the equipment to any object. This space allows an adequate air flow from the ventilating fan to keep the transceiver cool.

CAUTION:

Do not operate the radio in an RF Field greater than 6V RF. Receiver damage may occur.

2.3 CABLING (See Figure 2-1.)

■ GROUND

To prevent electric shock, and reduce the possibility of TVI and BCI, connect the transceiver to a good earth ground, through as short a lead as possible. Use ground rods or metal cold water feedline.

■ ANTENNA

Connect through a 50 ohm antenna feedline to the coaxial connector on the rear panel.

■ KEY

If CW operation is desired, connect a key to the KEY jack. Use shielded line or coaxial cable.

■ POWER CONNECTIONS

Make sure the POWER switch on the front panel is turned off, the stand-by switch is in the REC position, and the line voltage is correct. Then connect the POWER cord to the line source.

■ AC POWER

For fixed station operation, the TS-830S operates from 120 VAC, 50/60 Hz power source capable of supplying 280 watts or more.

2.4 MICROPHONE

Attach the microphone connector to a suitable microphone, as shown in Figure 2-1. Be sure the microphone PTT switch is separate from the microphone circuit, as shown in Figure 2-3.

It should be noted that a microphone with a 3P plug using a common ground terminal should not be used.

The microphone input is designed for 50 kohm microphones. The choice of microphone is important for good speech quality, and should be given serious consideration. The crystal lattice filter in the transceiver provides all the restriction necessary on audio response, and further restriction in the microphone is not required. It is more important to have a microphone with a smooth, flat response throughout the speech range.

Follow the microphone manufacturer's instructions for connecting the microphone cable to the plug. With many microphones, the push-to-talk button must be pressed to make microphone audio available. For VOX operation, this unwanted feature may be eliminated, if desired, by opening the microphone case and permanently connecting the contacts which control the microphone audio.

Standard microphone sensitivity is within the range of -50 dB to -60 dB. If a microphone having a higher sensitivity is used, the ALC and compressor circuits will not function properly. In this case, insert in the mike line an attenuator as shown in Fig. 2-1. A typical MIC gain control setting is 12 o'clock. If you must run this control at 9 o'clock or less, use an attenuator.

2.5 KEY

If CW operation is desired, connect a key to the KEY jack. Use shielded cable, and a standard (mono or 2P) phone plug.

Headphones

Use headphones of 4 to 16Ω impedance. The optional HS-4, HS-5 headphones best suited for use with the TS-830S Stereo-type stethophones can also be used.

Microphone

Either a low or high impedance microphone (500Ω to 50 kΩ) can be used. The P.T.T. switch should be isolated from the mic circuit (shown in "A"). Use a microphone with a separate switch and MIC line so both P.T.T. and VOX are available.

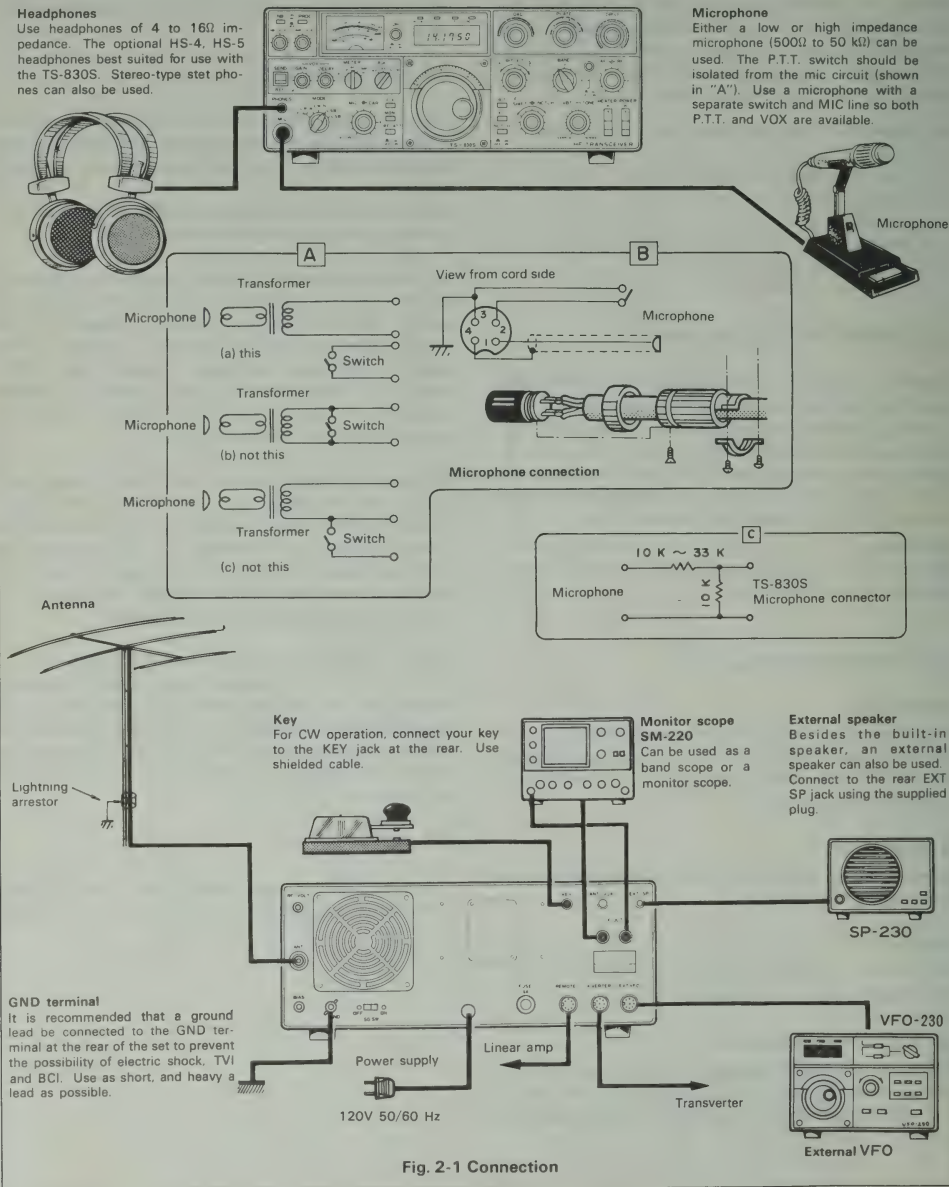
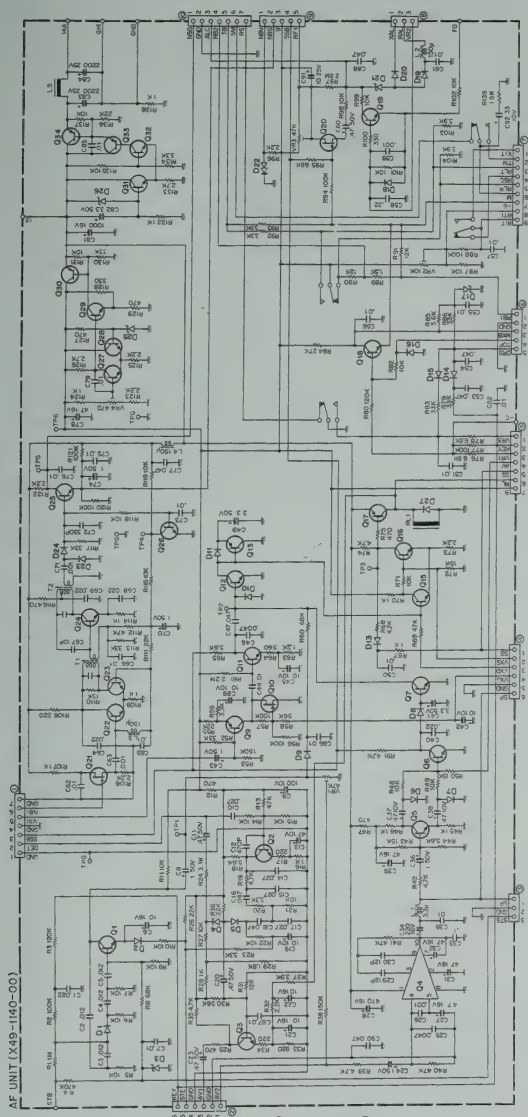


Fig. 2-1 Connection

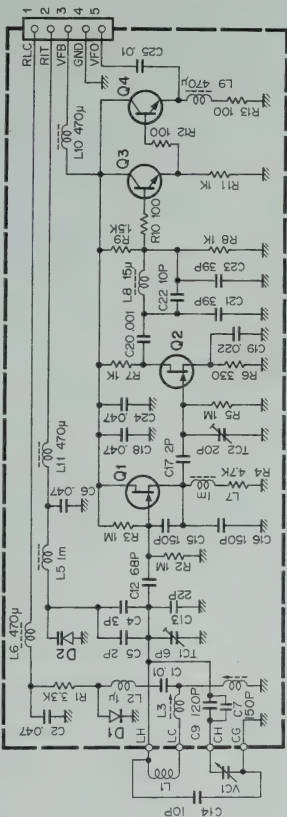
TS-830S SCHEMATIC DIAGRAM

AF UNIT (X49-1140-00)

VFO UNIT (X40-1170-00)



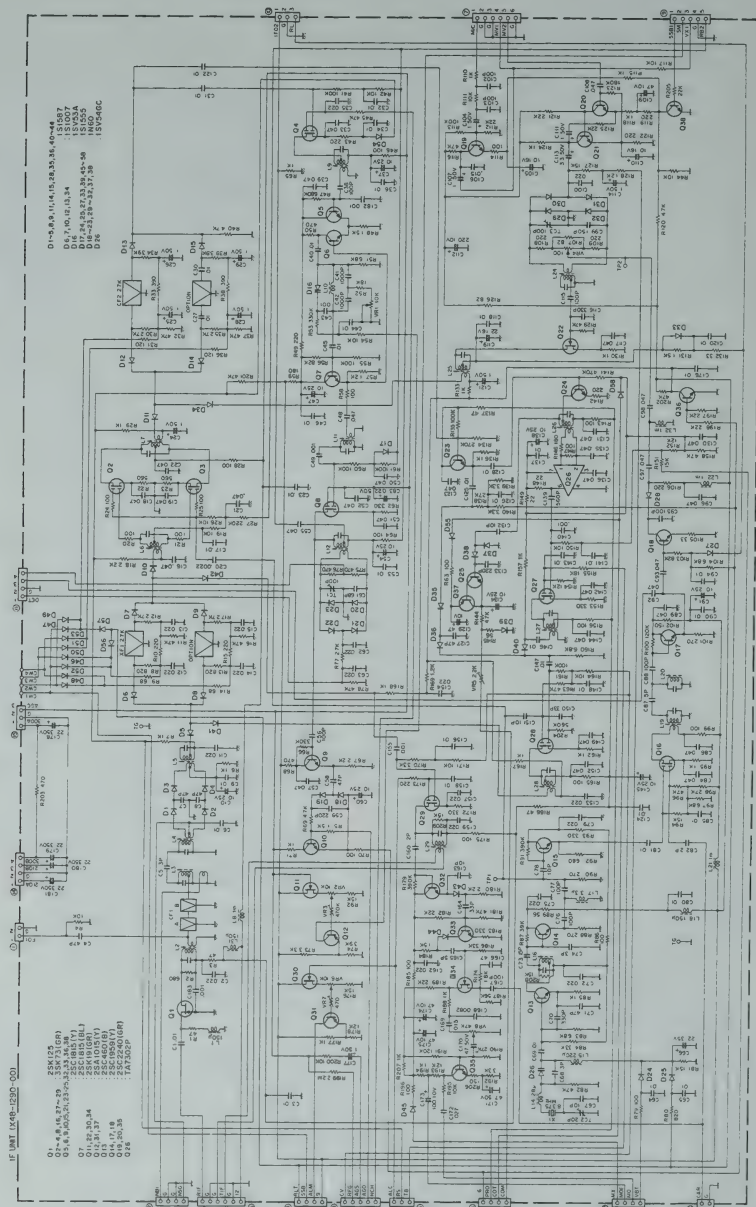
VFO UNIT (X40-1170-00)



Q1,2 : 2SK19(Y) D1 : 1S2588
Q3 : 2SA46(B) D2 : 1SV53A
Q4 : 2SC1959(Y)

O1,2-B,1,1,12 2SC745(D)
O2,3 2SC733
O3,3,3,1 2SC2240(B)
O4,3,3,1 2SA805(Y)
O5,3,3,1 2SC1810(B)
O6,3 2SC1810(B)
O7 2SC705(Y)
O8 2SC705(Y)
O9 2SC705(Y)
O10 2SC705(Y)
O11 2SC705(Y)
O12 2SC705(Y)
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O99 2SC705(Y)
O100 2SC705(Y)

IF UNIT (X48-1290-00)



TS-830S SPECIFICATIONS

[GENERAL]

Frequency Range	160 m Band 1.8 ~ 2.0 MHz 80 m Band 3.5 ~ 4.0 MHz 40 m Band 7.0 ~ 7.3 MHz * 30 m Band 10.1 ~ 10.15 MHz (10.0 MHz WWV) 20 m Band 14.0 ~ 14.35 MHz * 17 m Band 18.068 ~ 18.168 MHz 15 m Band 21.0 ~ 21.45 MHz * 12 m Band 24.89 ~ 24.99 MHz 10 m Band 28.0 ~ 29.7 MHz
Modes	SSB/CW
Frequency Stability	Within 100 Hz during any 30 minute period after warmup. Within 1 kHz during the first hour after 1 minute of warmup.
Power Requirement	120V AC (220V modifiable), 50/60 Hz
Power Consumption	Transmit: 295 watts Receive: 32 watts (with heaters off)
Dimensions	333 (13.3) × 133 (5.3) × 333 (13.3) mm (inch)
Weight	13.5 kg (29.8 lbs)

[TRANSMITTER]

*Final Power Input	220W PEP for SSB operation 180W DC for CW operation
Audio Input Impedance	500Ω ~ 50 kΩ
RF Output Impedance	50Ω ~ 75Ω
Carrier Suppression	Better than 40 dB
Sideband Suppression	Better than 60 dB
Spurious Radiation	Better than 60 dB
Harmonic Radiation	Better than 40 dB
Audio Freq. Response	400 to 2,600 Hz, within -6 dB
3rd Order Intermodulation Distortion	Better than -36 dB

[RECEIVER]

Receiver Sensitivity	0.25 μV at 10 dB S + N/N
Image Ratio	Better than 60 dB
IF Rejection	Better than 80 dB
Receiver Selectivity	
SSB/CW WIDE	2.4 kHz (-6 dB), 3.6 kHz (-60 dB)
CW NARROW	With YK-88C (option) 500 Hz (-6 dB), 1.5 kHz (-60 dB) With YK-88CN (option) 270 Hz (-6 dB), 1.1 kHz (-60 dB) With YG-455C (option) 500 Hz (-6 dB), 820 Hz (-60 dB) With YG-455CN (option) 250 Hz (-6 dB), 500 Hz (-60 dB)
Variable Bandwidth	
SSB	500 Hz ~ 2.4 kHz (-6 dB) continuously variable
CW	150 Hz ~ 500 Hz (-6 dB) continuously variable With optional filter YK-88C and YG-455C added.
Notch-filter Attenuation	Better than 40 dB
Audio Output Impedance	8 ~ 16Ω
Audio Output	1.5W (8Ω)

*Will transmit on the new 30, 17, and 12 meter bands. Diodes installed for preventing accidental transmission before government Amateur authorization.

NOTE: The circuit and ratings may change without notice due to developments in technology.

SECTION 1. INTRODUCTION AND FEATURES

1.1 KENWOOD TS-830S

The TS-830S is a highly sophisticated solid state Amateur band transceiver employing only three vacuum tubes.

Operating on all Amateur bands between 1.8 and 29.7 MHz, this unit is constructed modularly. The TS-830S includes many built-in features usually found as extras on other transceivers. Included are VOX, 25 kHz calibrator, RIT, RF attenuator, and an effective noise blanker. The TS-830S also includes automatic gain control (AGC), automatic level control (ALC), semi-break-in CW with sidetone, a speech processor, speaker and built-in AC power supply.

Designed for operation on SSB or CW, the TS-830S delivers more than 220 watts PEP input.

Any complicated electronic device will be damaged if operated incorrectly, and this transceiver is no exception. Please read all of the operating instructions before putting the TS-830S on the air.

1.2 FEATURES

1. Interference-free DX operation

* Variable bandwidth IF filter circuit (VBT)

The built-in VBT (Variable Bandwidth Tuning) circuit allows IF filter pass-bandwidth to be varied as you wish to eliminate unpleasant interference. It is adjustable independent of the IF shift.

* IF shift circuit

The IF SHIFT is a circuit to shift IF pass-bandwidth without changing receive frequency. It eliminates interference or adjusts receive frequency characteristic as desired.

* High reliability 455 kHz notch circuit

Interference is also eliminated by the built-in notch circuit. The TS-830S uses 455 kHz notch-frequency. The notch circuit shifts the BFO frequency and the mixer local frequency at the same time, thereby equivalently changing the notch frequency. Thus, accurate notch characteristic is realized even when the notch point is changed, completely eliminating nearby interference signals.

* NARROW/WIDE BANDWIDTH selection and optional filters for enhanced CW operation:

NARROW or WIDE CW operation can be selected when using the following optional filters:

YK-88C (500 Hz), YK-88CN (270 Hz).

YG-455C (500 Hz), YG-455CN (250 Hz)

* Variable tone control circuit.

2. WARC bands

The TS-830S fully covers 160-10 m Amateur bands, including the new WARC bands of 10, 18 and 24.5 MHz.

3. All-in-one, compact AC Power supply system

4. Advanced circuit design for improved two-signal characteristics.

Cleverly designed front-end circuit components and receive circuit system assure excellent two-signal characteristics. Cross-modulation and blocking are reduced.

5. TX final unit uses 6146B's

The finals are a pair of 6146B transmitting tubes. RF negative feedback and amplified ALC provide clear, strong signals with reduced cross modulation.

6. Variable level noise blanker

Conventional fixed level noise blankers are sometimes less than effective in removing pulsating noise over weak signals or rejecting strong interference signals. This variable level noise blanker is equipped to control the optimum threshold level of the gate pulse amplifier.

7. RF speech processor to increase average power during SSB operation

This is an RF clipper speech processor, using both the 455 kHz and 8.83 MHz IF's. Unwanted frequency components are removed by the 8.83 MHz crystal filter, providing a compression ratio of approximately 20 dB.

8. Transmit monitor circuit

The built-in monitor circuit permits easy adjustment of the RF processor and MIC GAIN.

9. XIT (Transmit Incremental Tuning) for fine adjustment of transmit frequency independent of receive frequency.

10. A combination of precise, easy-to-read digital frequency indicator and an analog dial.

The digital indicator has a Digital Hold memory function.

11. The controls are arranged on the die-cast front panel for easy operation.

12. A full variety of accessory circuits are provided:

The TS-830S includes:

VOX circuit (available for Semi-Break in), Marker circuit, side-tone oscillator, 3-position AGC circuit (OFF, FAST, SLOW), RF ATT, FIX circuit, Audio frequency characteristics selector circuit for each MODE, CW zero-in circuit, IF OUT terminal, HEATER switch, SG switch, Built-in speaker.

2.6 EXTERNAL SPEAKER AND HEADPHONES

Receive audio output from the TS-830S is 1.5 watts at 4 to 16 ohms. The TS-830S has a built-in the SPEAKER jack on the rear panel. The speaker may be an 8-ohm permanent-magnet type, 4 inches or larger. The internal speaker is disconnected when an external speaker is used. Headphones should also be 4 to 16 ohms impedance. When the headphones are connected to the front-panel PHONES jack, the speaker is disabled.

2.7 GROUND

To prevent electric shock, and reduce the possibility of TVI and BCI, connect the transceiver to a good earth ground through as short and heavy a lead as possible.

2.8 ANTENNA

Any of the common antenna systems designed for use on the high frequency amateur bands may be used with the TS-830S, provided the input impedance of the transmission line is not outside the capability of the pi-output matching network. The transmission line should be coaxial cable. An antenna system which shows a standing wave ratio of less than 2:1 when using 50 or 75 ohm coaxial transmission line, or a system that results in a transmission line input impedance that is essentially resistive, and between 15 and 200 ohms will take power from the transceiver with little difficulty. If openwire or balanced type transmission line is used with the antenna, a suitable antenna tuner with balun is recommended between the transceiver and the feed line. Methods of construction and operating such tuners are described in detail in the ARRL Antenna Handbook, and similar publications. For operation on the 160, 75 and 40 meter bands, a simple dipole antenna, cut to resonance in the most used portion of the bands, will perform satisfactorily. For operation of the transceiver on the 10, 15 and 20 meter bands, the efficiency of the station will be greatly increased if a good directional rotary antenna is used. Remember that even the most powerful transceiver is useless without a proper antenna.

NOTE:

Protect your Equipment — Use a LIGHTNING ARRESTOR.

The "Q" of the antenna loading coil should be as high as possible.

The loading coil must be capable of handling the power of the transceiver without overheating. In the CW mode the power output of the transceiver will exceed 80 watts.

The SWR bridge is a useful instrument, but unfortunately it is quite often misunderstood, and overrated in importance. Basically, the SWR bridge will indicate how closely the antenna load impedance matches the transmission line. With long transmission lines, such as will be used in many fixed station installations, it is desirable to keep the impedance match fairly close in order to limit power loss. This is particularly true at the higher frequencies. The longer the line, and the higher the frequency, the more important SWR becomes. However, in mobile installations the transmission line seldom exceeds 20 feet in length, and an SWR of even 4 to 1 adds very little power loss. The only time SWR will indicate a low figure is when the antenna presents a load close to the 50 ohms, but many mobile antennas will have a base impedance as low as 15 or 20 ohms at their resonant frequency. In such a case, SWR will indicate 3 or 4 to 1, and yet the system will be radiating efficiently.

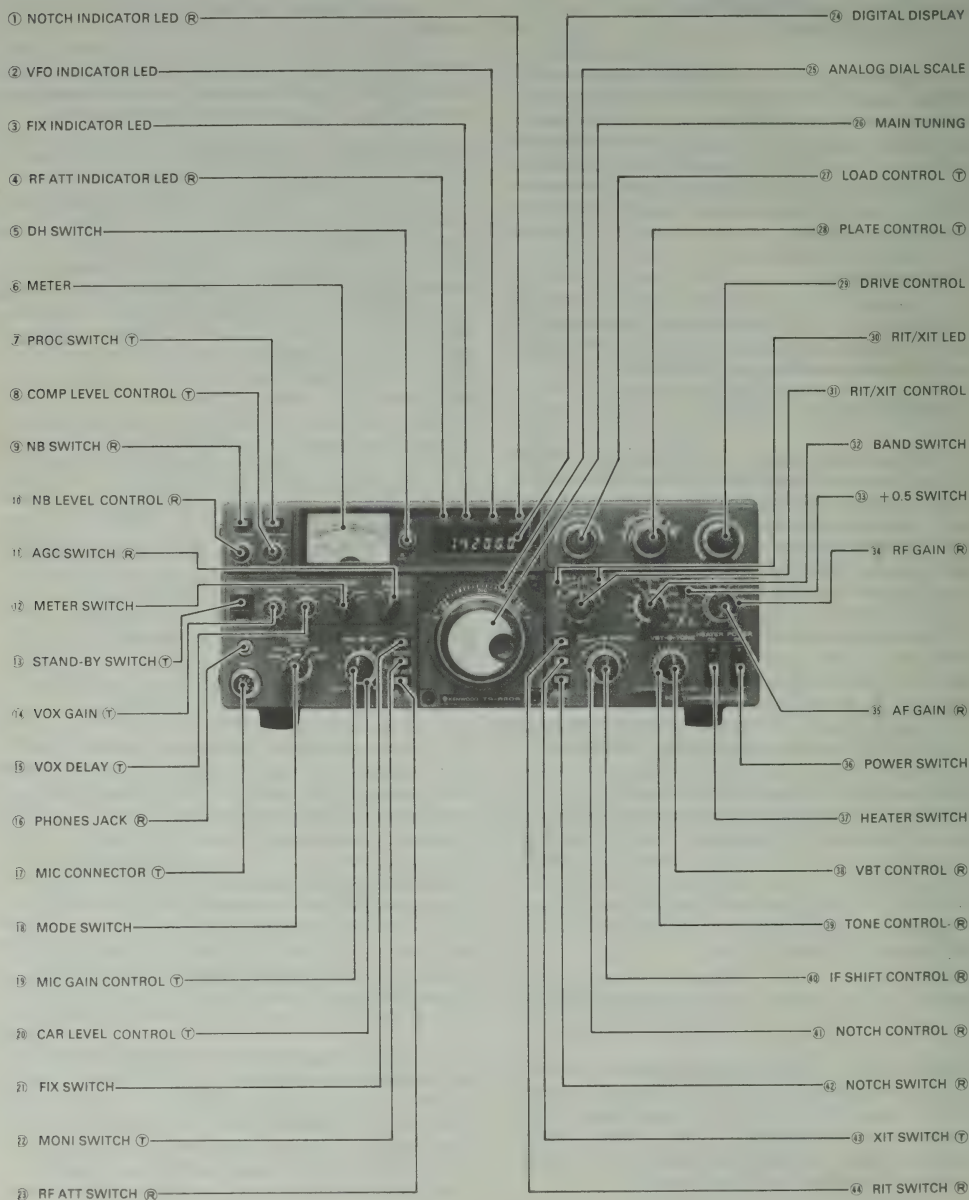
The really important factor in your mobile antenna is that it should be carefully tuned to resonance at the desired frequency. The fallacy in using an SWR bridge lies in the fact that it is sometimes possible to reduce the SWR reading by detuning the antenna. Field strength may actually be reduced in an effort to bring SWR down. Since field strength is the primary goal, we recommend a field strength meter for antenna tuning.

For antenna adjustments, the transceiver may be loaded lightly, using the TUNE position instead of operating at full power output. This will limit tube dissipation during adjustments, and will also help to reduce interference on the frequency. In any case, do not leave the transmitter on for very long at one time. Turn it on just long enough to tune and load, and get a field strength reading. Start out with the antenna whip at about the center of its adjustment range. Set the VFO to the desired operating frequency and then adjust the PLATE control for a dip, and then the LOAD control. Then observe the field strength reading. The field strength meter may be set on top of the dash, on the hood, or at an elevated location some distance from the car.

Change the whip length a half inch or so at a time, retune the finals each time, and again check the field strength at the antenna. Continue this procedure until the point of maximum field strength is found. This adjustment will be most critical on 75 meters, somewhat less critical on 40, until on 10 meters the adjustment will be quite broad. After tuning the antenna to resonance, the finals can be loaded to full power.

Mobile Station — Mobile antenna installations are critical, since any mobile antenna for use on the high frequency bands represents a number of compromises. Many amateurs lose the efficiency of their antenna through improper tuning. Remember the following points when using the TS-830S with a mobile antenna.

SECTION 3. CONTROLS AND THEIR FUCTIONS



3.1 FRONT PANEL

The symbol after the part name indicates:

Ⓡ: Active only during reception.

Ⓣ: Active only during transmission

No symbol: Always active

1. NOTCH INDICATOR LED Ⓡ

This indicator, (light emitting diode), illuminates when the NOTCH circuit is turned ON.

2. VFO INDICATOR LED

The VFO indicator illuminates when the internal VFO controls transceiver operation. The indicator is not lighted during fixed channel or remote VFO operation.

3. FIX (FIXED CHANNEL) INDICATOR LED

The FIX indicator illuminates when the internal fixed frequency oscillator controls transceiver operation.

4. RF ATT INDICATOR LED Ⓡ

This illuminates when the RF ATT is turned ON.

5. DH (DISPLAY HOLD) SWITCH

With this switch ON, the display frequency remains ON even if the main tuning is changed. This feature is used to memorize the original frequency when checking another frequency.

6. METER

The meter monitors six different functions, depending on METER switch position. In receive the meter is automatically an S-meter, and shows received signal strength on a scale of 0 to 40 dB over S9. In transmit, meter function depends on the position of the METER switch, as described below. This is an average-responding meter, NOT peak-reading.

7. PROC (SPEECH PROCESSOR) SWITCH Ⓣ

This switch is used during SSB operation. Set the switch to the ON position and the speech processor will be activated, increasing the average talk power. Compression level can be adjusted by the processor control (8).

8. COMP LEVEL CONTROL Ⓣ

This control adjusts compression level. Set the meter switch (12) to the COMP position and adjust this control while observing the meter COMP scale.

9. NB SWITCH Ⓡ

With the push switch, the noise blanker circuit is turned ON reducing pulse-type (ignition) noise. Power-line, radar, QRM and atmospheric "white" noises will not operate the blanker. The noise blanker circuit operating level is adjustable by the noise blanker control (10).

10. NB LEVEL CONTROL Ⓡ

This control adjust the noise blanker circuit (operating level) according to receiving conditions or noise level.

11. AGC SWITCH Ⓡ

This controls the AGC (Automatic Gain Control) circuit:

OFF..... AGC disabled (no AGC).

FAST..... Normally used for CW operation.

SLOW..... Normally used for SSB operation.

12. METER SWITCH

This determines the transmit meter function:

ALC (Automatic Level Control)

Monitors internal ALC voltage, or the ALC voltage feedback from a linear amplifier operated in conjunction with the TS-830S. For SSB operation the ALC reading for voice peaks should be within the indicated ALC range. ALC voltage adjustment is made with the MIC control for SSB and with the CAR control for CW.

IP (Plate Current)

In this position the meter monitors final tube plate current. The scale is calibrated from 0 to 350 ma.

RF (Output Power)

This monitors relative output power of the transceiver. There is no meter scale for this position. Normally the reading should be adjusted (with the RF VOLT control) for a 2/3 scale reading.

COMP

This indicates compression level when the speech processor is operating.

HV (High Voltage)

This position monitors the high voltage power supply. The meter scale is calibrated from 0 to 10, indicating 0 to 1000 volts.

13. STAND-BY SWITCH Ⓣ

This two-position lever switch selects:

REC..... The transceiver is receiving unless the microphone PTT switch, or the VOX circuit is activated.

SEND..... Locks the unit in transmit.

14. VOX GAIN (T)

This controls sensitivity of the VOX (Voice Operated Transmit) circuit.

15. VOX DELAY CONTROL

The DELAY control adjusts the hold time for VOX or break-in CW operation. Adjust for individual preference.

16. PHONES JACK (R)

The headphones jack allows use of a 4 to 16 ohm headphone through a 1/4" phone plug. When phones are used the speaker is disconnected.

17. MIC CONNECTOR (T)

The four pin connector allows use of a PTT microphone. Figure 2-1B shows plug wiring.

18. MODE SWITCH

The mode switch selects type of emission, and TUNE.

TUNE..... This position provides reduced carrier and shorted key line for transceiver tuning. (Input power to the final section is reduced to prevent tube damage during tune-up.)

CW.W..... Used for CW operation. A high-cut filter is inserted in the receiver audio circuit to reduce unwanted noise.

SSB filter selected for WIDE receive bandwidth.

CW.N..... (NARROW) Used for CW operation with CW filters YK-88C (500 Hz), YK-88CN (270 Hz), YG-455C (500 Hz) or YG-455CN (250 Hz), which are available as optional accessories. Without an optional CW filter installed, the pass-bandwidth is the same as in CW.W.

USB..... Used for upper-sideband operation. International Amateur practice dictates the use of USB on the 10, 14, 18, 21, 24.5 and 28 MHz bands.

LSB..... Selects lower-sideband. International Amateur practice dictates the use of LSB on the 3.5 and 7 MHz bands.

19. MIC GAIN CONTROL (T)

This control adjusts microphone amplifier gain for SSB operation. Adjust for an on-scale ALC reading on voice peaks.

In the CAL ON position, receive frequency can be calibrated at 25 kHz intervals using the built-in oscillator.

20. CAR LEVEL CONTROL (T)

This controls carrier level during CW operation. Adjust the CAR level so that the ALC meter points to the center of the ALC zone. The ALC meter should not read beyond the ALC zone.

21. FIX SWITCH

Place this switch ON for fixed channel operation; (An optional crystal is required. Trio-Kenwood does not supply these crystals.)

22. MONI (MONITOR) SWITCH (T)

This delivers a sample of the demodulated transmit IF signal to the AF for monitoring modulation.

23. RF ATT SWITCH (R)

With this switch ON, A 20 dB attenuator is inserted in the antenna circuit, protecting the RF amplifier and mixer from overload on strong input signals.

24. DIGITAL DISPLAY

The digital display indicates operating frequency to the nearest 100 Hz.

25. ANALOG DIAL SCALE

The mono-scale permits direct analog frequency readout over the 0 to 500 kHz range, graduated at 1-kHz intervals. Operating frequency equals the dial (in kHz) plus the BAND switch frequency (in MHz). An additional 50 kHz both above and below the 500 kHz range is also covered.

26. MAIN TUNING

This controls the VFO, selecting the transceiver's operating frequency. The indented knob is convenient for quick tuning.

27. LOAD CONTROL (T)

This controls the loading of the network between the final section and the antenna. Adjustment is described in Section 4.

28. PLATE CONTROL

This controls the plate tuning of the final amplifiers. Calibration is approximate.

29. DRIVE CONTROL

This control tunes the plate tank circuit of the 12BY7A driver as well as the receiver's antenna and mixer coils. In receive the DRIVE control is tuned for maximum sensitivity (maximum S-meter deflection), and in transmit for a maximum ON-SCALE ALC reading. These points occur concurrently. Tuning for one also achieves the other.

30. RIT/XIT INDICATOR LED

This indicator will light when the RIT switch (44) or XIT switch (43) is ON.

31. RIT/XIT CONTROL

This control allows the receive frequency, transmit frequency or both to be shifted without using the main tuning control. With the RIT switch (44) ON, the RIT circuit is activated to shift only the receive frequency.

With the XIT switch (43) ON, the XIT circuit is activated to shift only the transmit frequency.

When both switches are ON, both frequencies are shifted. The center (O) position equals no shift.

32. BAND SWITCH

The 10-position switch selects all Amateur bands from 1.8 to 29.7 MHz. To select the 28.5 or 29.5 MHz bands, push the +0.5 switch (33) ON.

Use the 10 MHz band for WWV reception. An AUX receive band is also available.

Coilpack (Receiver front-end) and PLL components must be installed and aligned for the specific receive frequency range desired.

33. +0.5 SWITCH

This switch is used in conjunction with the bandswitch (32.). Depress the switch with the bandswitch set to "28", and the transceiver will operate in the 28.5 MHz band. When the bandswitch is set to "29", the transceiver will operate in the 29.5 MHz band. This switch has no function at any other bandswitch position.

34. RF GAIN [®]

This adjusts receiver RF amplifier gain. Turn fully clockwise for maximum gain and a correct S-meter reading.

35. AF GAIN [®]

This adjusts receiver audio level. Volume increases clockwise.

36. POWER SWITCH

This switches all power to the transceiver.

37. HEATER SWITCH

This switch turns the three transmitting tube filaments ON.

38. VBT CONTROL [®]

The VBT (Variable Bandwidth Tuning) continuously adjusts the IF Filter bandwidth to eliminate radio interference. For normal operation, this control may be left fully clockwise (NORMAL Position).

39. TONE CONTROL [®]

This adjusts audio tone quality of received signals. Adjust as desired.

40. IF SHIFT CONTROL [®]

During reception, the center frequency of the IF crystal filter can be shifted ± 1.2 kHz facilitating adjustment of tone quality, or eliminating interference from nearby frequencies. For normal operation, set to the center detent position (click stop).

41. NOTCH CONTROL [®]

Turn the NOTCH switch ON to activate the Notch filter. Adjust the notch frequency to null a beat (tone interference) signal.

42. NOTCH SWITCH [®]

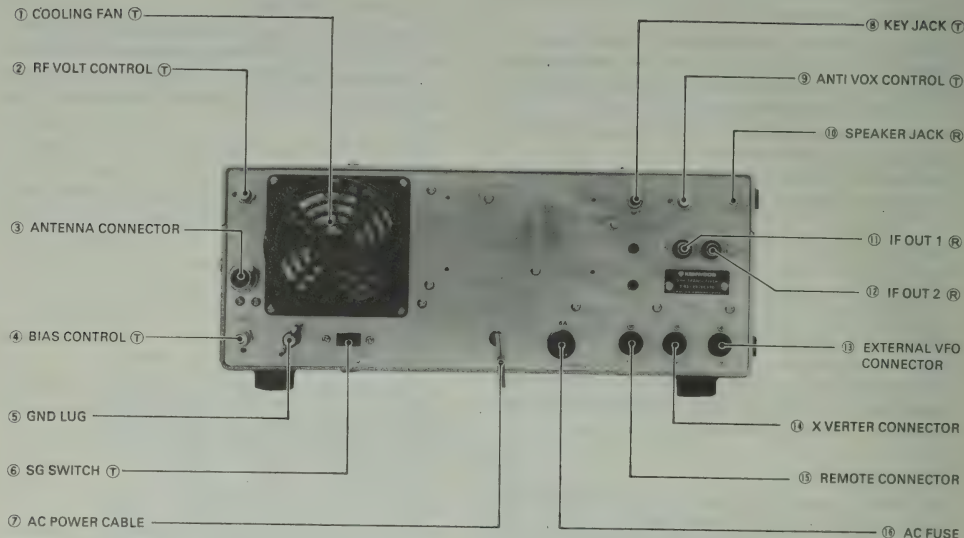
This switch controls the NOTCH circuit and indicator.

43. XIT SWITCH [Ⓟ]

This push switch activates the XIT (Transmit Incremental Tuning) circuit and the XIT indicator. By adjusting the XIT control, the VFO transmit frequency can be varied ± 2 kHz without changing the receive frequency.

44. RIT SWITCH [®]

This push switch activates the RIT (Receiver Incremental Tuning) circuit, and the RIT indicator. By adjusting the RIT control, the VFO receive frequency can be varied ± 2 kHz, without changing the transmit frequency. If, both switches are ON, both the transmit and receive frequencies will shift simultaneously.



3.2 REAR PANEL

1. COOLING FAN (T)

This fan cools the RF amplifier section to insure reliable and efficient operation.

2. RF VOLT CONTROL (T)

This adjusts the RF output meter reading. Set for 2/3 scale reading during CW transmission.

3. ANTENNA CONNECTOR

This SO-239 coax connector should be attached to a suitable 50Ω antenna for transmitting and receiving.

4. BIAS CONTROL (T)

This adjusts the bias voltage to the (6146B) amplifier tubes. Clockwise rotation increases the idling plate current. Section 4 describes adjustment to 60 ma.

5. GND (GROUND) LUG

To prevent electric shock, as well as RFI and BCI, connect the transceiver to a good earth ground.

6. SG SWITCH (T)

This slide switch controls the screen grid voltage to the final tubes. For neutralizing, switch OFF. The switch remains ON for normal operation.

7. AC POWER CABLE

This cable is used to connect an AC power source to the transceiver.

8. KEY JACK (T)

Using shielded line, connect a key to this 1/4" phone jack for CW operation. Key open-terminal voltage is approximately -65V.

9. ANTI VOX CONTROL [Ⓟ]

Adjust the control to prevent speaker output from tripping the VOX.

10. SPEAKER JACK [Ⓟ]

The receiver audio output can be connected through this jack to an external 4 to 16 ohm speaker. The internal speaker is disconnected when an external speaker is connected.

11. IF OUT 1 [Ⓟ]

A Buffered Mixer output for pan display use. This is a wide-band, low-level IF signal.

12. IF OUT 2 [Ⓟ]

A high-level, narrow-band IF output, taken before the RX Produce Detector, for scope display of received signal waveform.

13. EXTERNAL VFO CONNECTOR

This DIN connector is used to interface the KENWOOD VFO230 external VFO. The interconnecting cable is provided with the VFO-230.

PIN	FUNCTION	PIN	FUNCTION
1	VFO signal	5	VFO control
2	Relay control (+ on transmit)	6	Display control
3	+9V	7	Ground
4	CW freq. shift control	8	+12V

14. X VERTER CONNECTOR

This DIN connector is used to interface a VHF transverter.

PIN	FUNCTION	PIN	FUNCTION
1	Ground	5	Transverter input
2	Relay control (+ on transmit)	6	Transverter ALC input
3	Ground	7	Transverter output
4	X-verter ON-OFF control	8	HF ANT output

15. REMOTE CONNECTOR

This connector is used to interconnect a linear amplifier or other accessory item.

PIN	FUNCTION	PIN	FUNCTION
1	Record output (100~150 mV AF)	5	Normally closed (relay contact)
2	Relay common terminal (NOT grounded)	6	ALC input ALC threshold level approx. -6V
3	PTT line	7	No connection
4	Normally opened (relay contact)		

16. AC FUSE

This fuse protects the transmitter power supply against short circuits. Never use a higher amperage fuse than specified; it will eventually cause extensive damage. If the fuse blows, try to determine the cause before replacing.

For 120 volt operation use a 6 ampere fuse.

SECTION 4. OPERATION

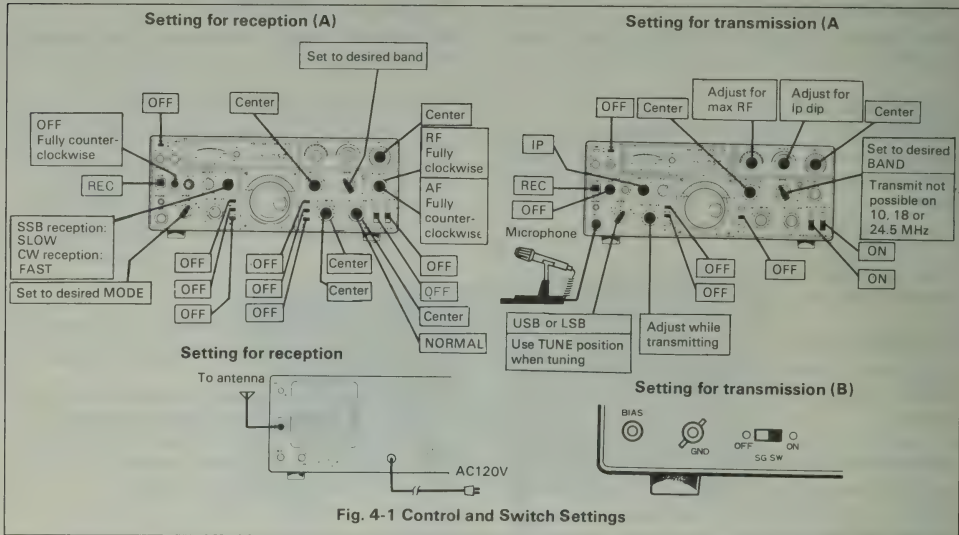


Fig. 4-1 Control and Switch Settings

4.1 RECEPTION (I)

NOTE:

Set the MIC and CAR controls to minimum to prevent accidental transmission before tune-up is completed. The TS-830S must be operated into a 50 ohm antenna or dummy load with an SWR less than 2:1. Random length wire antennas or light-bulb dummy loads cannot be used. Conventional half-wave dipoles and beam antennas should only be used at or near their resonant frequency. Exceeding an SWR of 2:1 can damage the output stage of the transceiver.

(1) Basic Procedures for Receive Operation

The TS-830S has many advanced features such as VBT, IF SHIFT, NOTCH, etc. to assure enhanced receive operation. For the use of these specialized controls and switches, refer to Section 4.2 "Reception (III)"

With a suitable antenna and microphone or key connected to the transceiver, set the controls as described in Fig. 4-1.

Turn the POWER switch ON. The meter, dial scale, and VFO indicator will light, indicating the transceiver is operating. Advance the AF GAIN control clockwise until some receiver noise is heard in the speaker. Turn the main tuning dial within the frequency range of the Amateur band chosen until a signal is heard. Tune the signal for clearest reception, and then adjust the DRIVE control for maximum S-meter deflection.

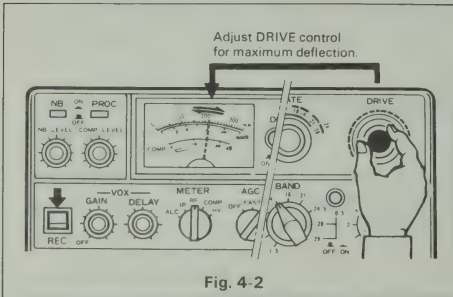


Fig. 4-2

(2) WWV Reception

Set the band switch to "10" and turn the main tuning control to 10.0 MHz.

4.2 RECEPTION (II)

This section covers operation of controls and switches to provide the maximum performance from the TS-830S.

(1) RF ATT SWITCH

The input to the receive RF amplifier is attenuated approximately 20 dB, providing distortion-free reception. This feature may be used in cases of receiver overload, caused either by a strong local signal, or during weak signal reception when a strong adjacent signal may blank the receiver.

(2) RF GAIN CONTROL

RF GAIN is controlled by changing the AGC threshold voltage. Adjust the RF GAIN so the S-meter does not deflect excessively. This also reduces noise during reception. For normal operation, this control should be turned fully clockwise for maximum sensitivity.

(3) AGC (AUTOMATIC GAIN CONTROL)

Set the AGC switch to the appropriate position: Generally for SSB, SLOW, for CW FAST, and for very weak signals, the AGC may be turned OFF.

Simultaneous Use of the RF GAIN CONTROL and AGC Switch

If a strong signal (such as a local station) appears in the vicinity of the intended receive signal, the S meter may show unusual deflection due to the AGC voltage developed from the strong disturbing signal. If this occurs, turn the RF GAIN down so the meter pointer remains at about the original deflection peak and turn the AGC switch OFF. This will eliminate the unwanted AGC voltage and permit clear reception.

(4) RIT/XIT

First set the RIT/XIT control to center, and turn the RIT switch ON.

The RIT/XIT control allows shifting the receive frequency by approximately ± 2 kHz without changing the transmit frequency.

With the RIT switch ON, the receive frequency can be adjusted by using the RIT control.

With both the RIT and XIT switches ON, both the transmit and receive frequencies can be shifted.

For XIT switch operation, refer to Section 4.4 "Transmission (II)".

NOTE:

When the RIT is ON, transmit frequency is different from the receive frequency. For normal operation, leave the RIT switch OFF. It should be turned ON only when needed.

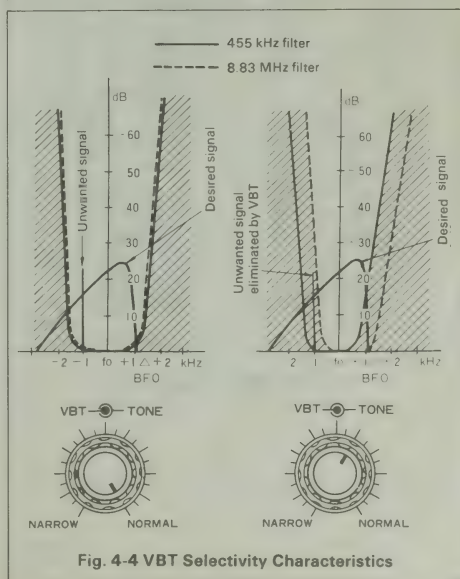
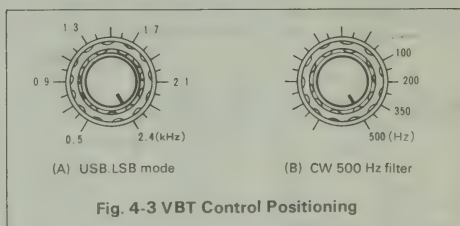
(5) VBT CONTROL (Variable Bandwidth Tuning)

This control is used to eliminate radio interference by changing the IF passband-width. Use this control in

conjunction with the IF SHIFT and NOTCH filter to obtain optimum results. By setting the VBT control to the NORMAL position, maximum passband-width is obtained. The IF filter passband-width is narrowed as the control is adjusted counterclockwise, while center frequency remains unchanged. Fig. 4-4 illustrates operation. The range of variability depends on the type of optional filter used.

- (i) When the filter bandwidth is 2.4 kHz (without an optional filter), the passband-width varies within the range of 500 Hz to 2.4 kHz. See Fig. 4-3.
- (ii) With an optional YK-88C filter (8.83 MHz, 500 Hz bandwidth) or YG-455C filter (455 kHz, 500 Hz bandwidth), the passband-width varies from 500 Hz to approximately 150 Hz.

Since an optional filter center frequency is 700 Hz higher than that of the built-in 2.4 kHz filter, the CW receive tone will be about 800 Hz without using the IF shift. Fig. 4-4 shows the VBT function with an optional filter.



(6) IF SHIFT

By using the IF SHIFT during reception, the crystal filter passband frequency can be shifted approximately ± 1.2 kHz. This is achieved by use of a PLL (Phase-Locked Loop) in the L.O. (local oscillator) circuit. This is a major feature of the TS-830S and can be used in the following cases:

1. Adjustment of tone quality and interference rejection during SSB Reception.

When the transceiver is on 20 meters and above, USB mode, turn the IF SHIFT in the "+" direction and the lower frequencies are attenuated. Turning the knob in the "-" direction cuts the higher frequencies. (These procedures are reversed for LSB operation below 20 meters). Adjust the control to your listening preference. The IF SHIFT is also effective in eliminating interference from adjacent receive signals.

2. Adjustment of tone quality during CW operation.

For detailed descriptions, refer to Section 4.4 (5) "CW operation".

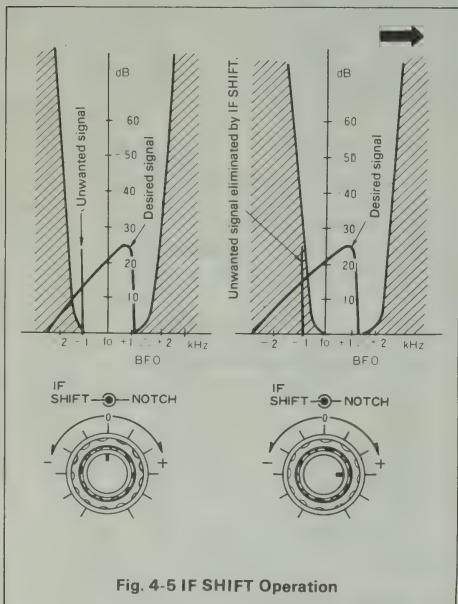


Fig. 4-5 IF SHIFT Operation

(7) VBT AND IF SHIFT COMBINATION

If excessive radio interference is encountered during SSB operation, adjust the VBT for optimum bandwidth, and the IF SHIFT for maximum intelligibility.

In CW mode, first adjust the VBT. Turn the IF SHIFT "-" (counter clockwise), adjusting for approximately 800 Hz tone. If pitch lower than 800 Hz is desired, adjust the RIT and IF SHIFT.

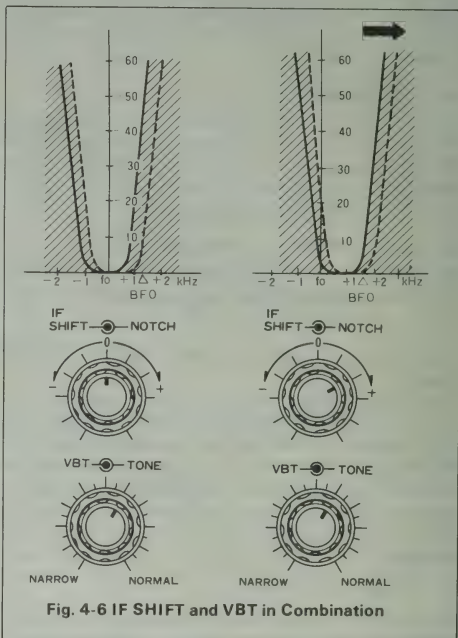


Fig. 4-6 IF SHIFT and VBT in Combination

(8) NOTCH CONTROL

If a single tone such as a CW signal is superimposed on the receive signal, turn the NOTCH ON and adjust the NOTCH control to eliminate or minimize the beat signal. A beat of approximately 1.5 kHz can be eliminated at the center position of the control. In USB or CW mode, a beat signal lower than 1.5 kHz can be eliminated by turning the control clockwise. In LSB mode, adjust the control counterclockwise.

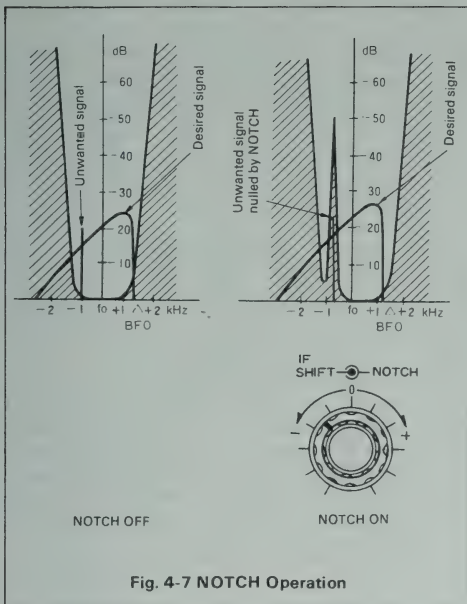


Fig. 4-7 NOTCH Operation

(9) NOISE BLANKER (NB)

For pulse type noise, such as generated by automotive ignition systems, turn the NB switch ON. Adjusting the NB LEVEL control varies the blanker's threshold, eliminating even low level noises.

If high level signal or noise is present on an adjacent frequency, do not use excessive NB threshold LEVEL as it may distort the received signal.

(10) TONE CONTROL

Adjust this control to obtain desired tone quality.

4.3 TRANSMISSION (I)

This section covers adjustment of the transceiver for transmission.

Refer to Fig. 4-1 for initial transmitter switch settings. Set the main tuning to the desired operating frequency. (Refer to Table 4-1 for a summary of the following.)

CAUTION:

DO NOT turn the BANDSWITCH while the transceiver is in transmit mode.

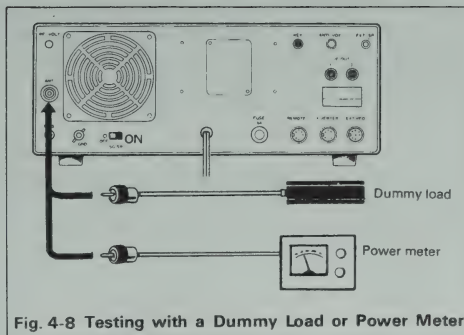


Fig. 4-8 Testing with a Dummy Load or Power Meter

1. Connect a 50 Ω antenna for the band you will operate or a dummy load, and connect a Key. SWR must be 2:1 or better. The life of the final tubes is directly related to the SWR of the antenna, and to the length of tuning periods.
2. Turn POWER and HEATER Switches ON.
3. Place the MODE switch to SSB, METER switch to Ip.
4. Place the STAND-BY switch to SEND and adjust bias to 60 mA with the BIAS control on the rear panel.

CAUTION:

If the plate current is higher than 60 mA do not leave the stand-by switch on for more than a few seconds. Excessive plate current shortens the life of the final tubes.

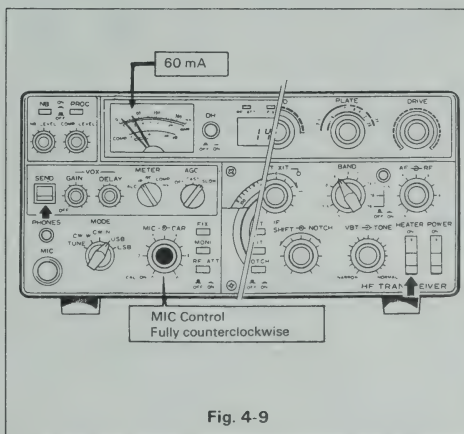


Fig. 4-9

5. Place **MODE** switch to **TUNE**, **METER** switch to **ALC**. Peak the **DRIVE** control. If the meter pegs or goes out of the ALC range, reduce the **CARRIER** control setting for an on-scale reading. (the **CAR** control is a level adjustment, while the drive control is a resonative, adjustment.)

NOTE:

The **TUNE** position permits tuning of the final tank circuit at reduced power without danger to the tubes. In the **TUNE** position, the screen voltage to the finals is reduced approximately 50% and the keying circuit is closed.

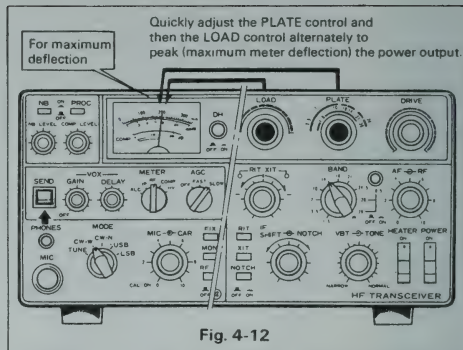


Fig. 4-12

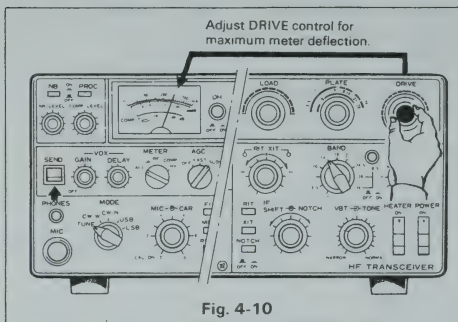


Fig. 4-10

7. Place the **METER** switch to **RF**, **MODE** switch to **CW**. Close the **Key** and repeak the **LOAD** and **PLATE** for maximum **RF** output. You may at your option also redip the **Plate** for maximum **RF** output. Open the **Key**. You are tuned up for **CW** operation. If necessary, adjust the **RF VOLT** control on the rear panel to bring the output reading to about 2/3 scale. This is a meter adjustment, not an output adjustment.

6. Place the **METER** switch to **RF** and peak the **PLATE** control.

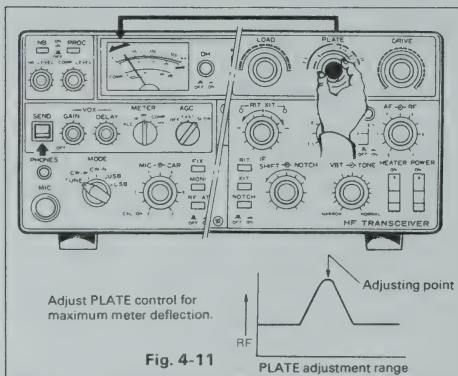


Fig. 4-11

Table 4-1. Summary of Transmitter Tuning Procedure

MODE Switch	METER Switch	Stand-by Switch	Procedure
USB or LSB	IP	REC→ SEND	Adjust BIAS control for 60 ma.
TUNE	ALC	REC→ SEND	Peak the ALC reading with the DRIVE control.
TUNE	RF	REC→ SEND	Peak the RF reading with the PLATE control.
CW	RF	REC→ SEND	Peak RF output by alternately adjusting the PLATE and LOAD controls.

(1) SSB OPERATION

Tune the TS-830S as described in steps 1 through 7. Set the MODE switch per Table 4-2, to USB or LSB and connect a microphone to the MIC input.

NOTE:

International Amateur practice dictates using USB or LSB as in Table 4-2.

To operate SSB, connect a microphone. (The Key and CARRIER control have no effect in SSB mode.) Place the MODE switch to SSB, METER switch to ALC. Adjust the MIC gain control for an on scale ALC reading on voice peaks. (Disregard RF and Ip meter readings in SSB- they are not accurate or relevant.)

TABLE 4-2.

1.8 MHz Band	LSB
3.5 MHz Band	LSB
7 MHz Band	LSB
10 MHz Band	USB
14 MHz Band	USB
18 MHz Band	USB
21 MHz Band	USB
24.5 MHz Band	USB
28 MHz Band	USB

■ PTT (Push to talk) OPERATION

By using a microphone equipped with a PTT switch, the transceiver is ready for PTT operation. To key, depress the PTT switch with the stand-by switch left in the REC position.

NOTE:

1. Transmission is impossible with the BAND switch set to AUX 10, 18 or 24.5.
2. Do not set the unit to the transmission mode when the BAND switch is set to AUX or is in midway between AUX and 1.5. Doing so will damage the drive vacuum tube 12BY7A.

4.4 TRANSMISSION (II)

To obtain maximum transmitter performance from your TS-830S you should understand the proper operation of the following controls and switches.

(1) SPEECH PROCESSOR

In SSB operation (particularly DX operation), it may be desirable to increase "talk-power" by using the speech processor. This may make the difference between a marginal, and a copiable signal.

Operation

The speech processor system in the TS-830S is an RFclipper using two filters, one in the VBT circuit and the other in the IF.

Turn the PROCESS switch ON and place the METER switch to COMP. Adjust the COMP LEVEL control while speaking into the microphone in a NORMAL tone of voice for a peak COMP scale reading of about 10-20 dB. Do not overdrive the COMPRESSOR: This will deteriorate voice quality, increase transmitter noise level, and in general make copying your signal more difficult.

Next, set the METER switch to ALC and adjust the MIC control while speaking into the microphone. Ensure that meter deflection is within the ALC zone.

(2) VOX (Voice Operated Transmit) OPERATION

Adjust the transceiver as described in the previous paragraph. Flip the VOX switch on and while speaking into the microphone, increase the VOX GAIN control until the VOX relay just operates. For VOX operation it is sometimes desirable to close-talk the microphone to prevent background noises from tripping the transmitter.

Check that the ALC reading for voice peaks is still within range on the meter. If necessary, adjust the MIC control for proper ALC reading.

If the VOX circuit is activated by speaker output, adjust the ANTI-VOX control (on the rear panel) as necessary for proper VOX operation.

Do not use excessive VOX or ANTI VOX gain more than necessary to control VOX operation. If the VOX circuit transfers between words, or holds too long, adjust the release time constant by the DELAY control.

(3) XIT

By using XIT, transmit frequency can be shifted independent of receive frequency.

With the XIT switch ON, the XIT is controlled by the RIT/XIT knob and transmit frequency can be shifted by about ± 2 kHz. When both the RIT and XIT switches are ON, both receive and transmit are shifted without adjusting the main tuning.

(4) MONITOR

To monitor transmitted SSB signal quality, turn the MONITOR switch ON to demodulate and sample a part of the transmit IF signal.

This feature is useful for checking modulation, or when adjusting the speech processor.

When monitoring, use a headphone to avoid audio feedback.

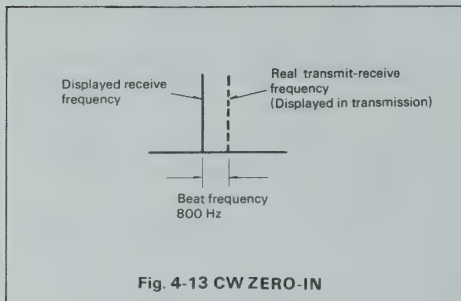
NOTE:

If the HEATER switch is OFF or the DRIVE control is incorrectly adjusted, the ALC circuit will not operate properly, causing excessively high transmit IF signal level, resulting in a distorted monitor signal.

(5) CW OPERATION

Tune and load the TS-830S as described in Sections 4.3. Using shielded line, connect a key to the rear panel KEY jack, set the MODE switch to CW, and set the stand-by switch to SEND for transmitting.

CW transmission is automatically monitored through the transceiver's speaker. Sidetone audio gain can be adjusted through the opening in the bottom cover.



(i) Reception

The TS-830S operates in two different CW modes: WIDE and NARROW. In the WIDE mode, the SSB filter (pass bandwidth 2.4 kHz, -6 dB) and an audio filter are used.

In the NARROW mode, option CW filters (YK-88C, YK-88CN, YG-455C, YG-455CN) are used to narrow the IF pass bandwidth to 500 Hz (-6 dB) or 250 Hz along with the audio filter. In both modes, high frequencies are cut off so the receive signal can be heard without high-frequency noise interference.

■ OPERATION WITHOUT CW FILTER

To receive CW, set the IF SHIFT control to its center position and the RIT switch to OFF. Adjust the main tuning for about an 800 Hz beat and your transmit frequency will be tuned (zeroed) to the transmit frequency of the station you are receiving. During reception, the side tone is activated by the key (VOX off). In this case, listen to the side tone superimposed on the receive signal and adjust the main tuning for similar side tone and incoming CW audio tone. By doing so, transmit frequencies will be zeroed. You may now adjust the RIT for a pitch which suits your preference. If interference is encountered, adjust the IF SHIFT. For more convenient and effective CW operation, use of the optional CW filters is recommended.

■ OPERATION WITH CW FILTER (OPTION)

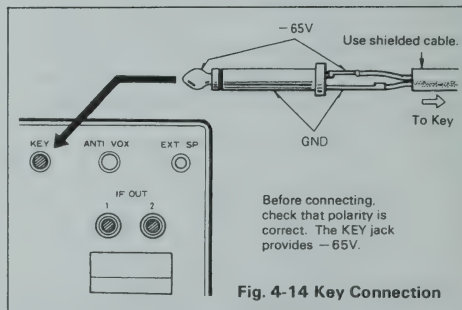
Set the IF SHIFT to its center position and the RIT OFF. Adjust the main tuning for maximum S-meter deflection. Receive signal pitch will be about 800 Hz, indicating correct tuning.

■ KEY CONNECTION (Fig. 4-7)

Your key should be connected as illustrated in Fig. 4-14. When using an electronic keyer, make sure that polarity is correct. Use shielded line from the key to transceiver.

NOTE:

When using an electronic keyer, set polarity of the keyer for NEGATIVE keying.



■ SEMI-BREAK-IN OPERATION

The TS-830S has a built-in side-tone oscillator to permit semi-break-in operation, besides the normal CW operation. During semi-break-in operation, the transceiver is set in transmit mode when the key is depressed, and returns to receive mode when the key is released. For semi-break-in operation, place the STANDBY switch to REC and turn the VOX GAIN control ON. Adjust the DELAY control for your preference.

4.5 FIXED CHANNEL OPERATION

A fixed channel is available for common use on all bands by installing a crystal in the socket on the PLL unit (X50-1680-00). The crystal frequency can be computed by the following formula:

Crystal Frequency (MHz) = 5.5 MHz - X + Operating Frequency (MHz).

X = Band Switch frequency (1.5, 3.5, etc.)

Crystal specifications: See Fig. 4-15

NOTE:

TRIO-KENWOOD does not supply crystals.

The shift stet circuit CW frequency between transmit and receive, and the RIT/XIT circuit are not effective in FIXED CHANNEL OPERATION.

To use the fixed frequency oscillator, depress the FIX push switch.

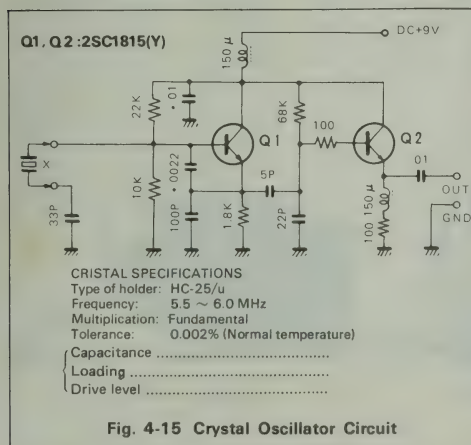


Fig. 4-15 Crystal Oscillator Circuit

4.6 DIGITAL DISPLAY CALIBRATION

Connect the antenna and set the BAND switch to WWV. Turn the main tuning dial to receive 10 MHz WWV. Adjust the dial until a low-frequency beat is heard. Next, turn the MIC control to the CAL position and a marker signal will be superimposed on the WWV signal. A double beat (two beat signals of high and low frequencies) will now be heard. Adjust the IF shift for low AF response.

While receiving this double beat, adjust the Standard oscillator trimmer through the reference frequency adjustment access opening (on the bottom of the TS-830S) so the two beats are heard as a single beat. Repeat this procedure 2 or 3 times. This completes calibration of the Digital Display. After calibration turn of the CAL switch.

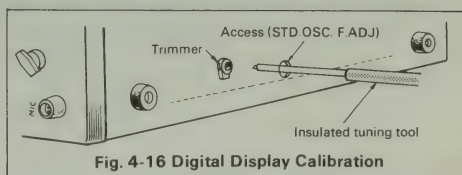


Fig. 4-16 Digital Display Calibration

4.7 ANALOG DIAL CALIBRATION

The main dial scale is graduated at 1 kHz intervals. One revolution of the main dial covers 25 kHz. To calibrate the scale, turn the MIC control to the CAL position. Zero-beat in SSB or CW mode. Hold the main tuning knob from rotating and slip the calibration ring to the nearest major (5 kHz) graduation. The dial is now calibrated.

NOTE:

For exact frequency, read the Digital Display.

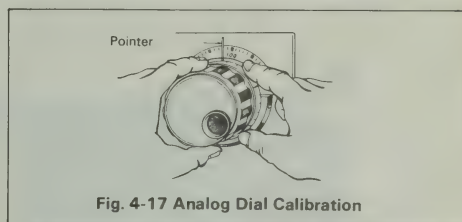


Fig. 4-17 Analog Dial Calibration

SECTION 5. OPTIONAL ACCESSORIES

5.1 OPTIONAL ACCESSORIES

The following optional accessories are available for use with the TS-830S.

■ REMOTE VFO

VFO-230:

The VFO-230 digital VFO provides maximum efficiency and flexibility for all operating conditions, including split-frequency operation, by combining a 20 Hz step digital VFO with five memories.

■ ANTENNA TUNER

AT-230:

The AT-230 antenna tuner includes the three new bands and such functional features as a through-line wattmeter, SWR meter and antenna selector switch.

■ EXTERNAL SPEAKER

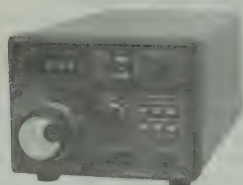
SP-230:

The SP-230 is a low-distortion speaker with selectable frequency response for high intelligibility in any mode. The frequency response is determined by the built-in audio filters, which are effective in improving signal-to-noise ratio under certain interference conditions, or when receiving weak signals.

■ LINEAR AMPLIFIER

TL-922A:

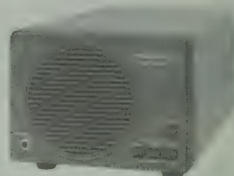
The TL-922A is an HF linear amplifier operating at maximum legal power, and employing a pair of 3-500Z high performance transmitting tubes.



VFO-230



AT-230



SP-230



TL-922A



SM-220

■ STATION MONITOR

SM-220:

Based on a wide-frequency-range oscilloscope (up to 10 MHz), the SM-220 station monitor features, in combination with a built-in two-tone generator, a wide variety of waveform-observing capabilities. An optional feature is a unique pan-display capability.

■ PHONE PATCH

PC-1: (Available only where phone patch operation is legal.)

■ HEAD PHONES

HS-5, HS-4: 8 Ω communications headphones.

■ MICROPHONE

MC-50: Desk Microphone (50 k Ω /500 Ω)

MC-35S: Noise Cancelling Hand Microphone (50 k Ω)

MC-30S: Noise Cancelling Hand Microphone (500 Ω)

■ FILTER

YG-455C: 500 Hz CW filter for 455 kHz IF

YG-455CN: 250 Hz CW filter for 455 kHz IF

YK-88C: 500 Hz CW filter for 8.83 MHz IF

YK-88CN: 270 Hz CW filter for 8.83 MHz IF

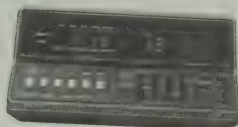
■ DIGITAL WORLD CLOCK

HC-10:

The HC-10 is a highly advanced world clock with dual display which can memorized 10 world major cities and 2 additional regions.



PC-1



HC-10



HS-4



HS-5



MC-50

5.2 INSTALLATION OF ACCESSORIES

■ REMOVING THE CABINET (See Fig. 5-1)

Figure 5-1 illustrates cabinet removal. Remove the eight top-cover and eight bottom-cover screws and lift a way the panels.

NOTE: _____
This product uses metric hardware.

CAUTION: _____
The speaker lead is attached to the chassis, so be careful when removing the top cover.
The lead can be unplugged, if necessary.

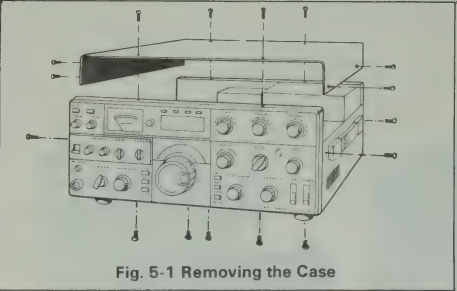


Fig. 5-1 Removing the Case

■ CW FILTER INSTALLATION

1. Using a number 2 Phillips screwdriver, remove the top cover (eight screws). Unplug the speaker and set the cover aside.
2. Remove the bottom cover (eight screws).
3. Remove the eight screws holding the IF unit X48-1290-00 and swing the printed-circuit board up and towards the front of the radio.
4. Using a 45-W (or less) soldering pencil, clear the six holes for the filter, if they are filled with solder.
5. There is no polarity to the filter. Install the filter into its position on the IF unit. Solder the two mounting tabs and the four input and output pins to the circuit boards. Solder sparingly, and heat the connections only long enough to insure a good solder joint. Don't overheat the filter or circuit board.
6. Carefully inspect your soldering. Be certain that all pins are actually soldered, and that you have not soldered across any spots on the board or between any of the pins on the filter. Clip the pins flush to the board.
7. Replace the IF unit. Make certain no wires will be pinched underneath the board. Replace the six screws.
8. Move the connector as illustrated from CW1 to CW2 ~ CW4.
9. Reinstall the bottom cover. Reconnect the speaker lead, and reinstall the top cover.

10. Apply power and verify your work. Filter installation is now complete.

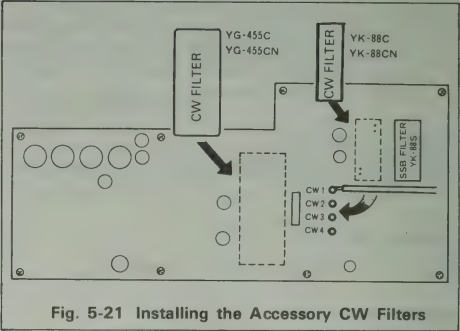


Fig. 5-21 Installing the Accessory CW Filters

8.8307 MHz	455.7 kHz	Terminal
YK-88C	—	CW ₂
YK-88CN	—	CW ₂
—	YG-455C	CW ₃
—	YG-455CN	CW ₃
YK-88C or YK-88CN	YG-455C or YG-455CN	CW ₄

■ VFO-230 CONNECTION (Fig. 5-3)

Connect the VFO-230 as shown in Fig. 5-3.
You will enjoy advanced operation including split-frequency capability by combining a 20 Hz step digital VFO with five memories.

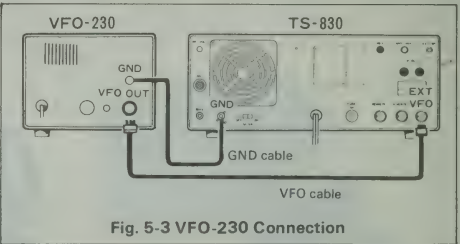


Fig. 5-3 VFO-230 Connection

■ ACCESSORY CONNECTIONS

Fig. 5-4 shows the ACSY connector. This DIN plug can be used for attaching a linear amplifier or other external accessories to the transceiver. Always use shielded line for all functions.

NOTE:

ALWAYS use shielded line for all connections.

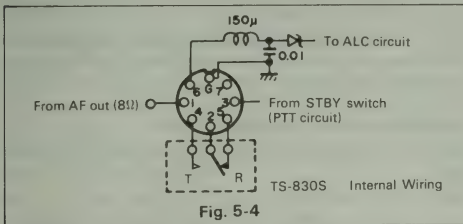


Fig. 5-4

■ SSTV, AFSK OPERATION

The TS-830S will adapt very well to slow scan television or AFSK RTTY operation. For SSTV, the only cabling required are connections between the MIC connector of the TS-830S and the camera output, and between the SPEAKER jack and the monitor input.

When transmitting, adjust the transmitter output so that final input power is less than 100W (less than 125 mA Ip), or for approximately 1/2 of normal output power. for AFSK, connect the T.U. output to the MIC input, and speaker output to the T.U. input.

■ PHONE PATCH OPERATION

The PC-1 Phone Patch may be used with the TS-830S. Recommended settings are:

PC-1	RX Gain	4
	TX Gain	4
	Null as necessary	
TS-830S	Vox Gain	1
	AF Gain	4
	Mic Gain	5
	Anti Vox Max	

Most other patches will work satisfactorily without any modification to the radio, requiring only an external speaker connection, and that the Mic line be run through the patch.

For those operators who desire a Patch input similar to the TS-520S or TS-820S, an input connection and terminal must be added at the Mic input preamp circuit.

Use a 100 kΩ resistor in series, with a 10 kΩ to ground on the input side of the 100 kΩ resistor. Use shielded line, and connect as follows:

On the IF unit X48-1290-00 install the fixed divider at the junction of R111 10 kΩ, C103, 100 pF and C104 1 μF (input of Q32). Add an RCA jack at one of the predrilled hole on the rear panel for input.

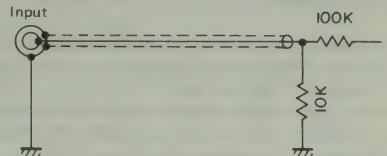


Fig. 5-5
Optional Special Phone Patch Input.

■ EXTENSION FEET

The TS-830S is provided with two extension feet which can be used to elevate the front panel. In some operating positions the tilt makes it easier to read the dial and meter. Fig. 5-6 shows how to install the feet.

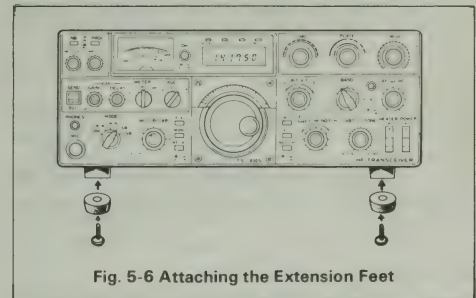


Fig. 5-6 Attaching the Extension Feet

SECTION 6. MAINTENANCE AND ALIGNMENT

CAUTION:

DANGEROUS HIGH VOLTAGES ARE PRESENT WITHIN THE CASE OF THE TS-830S WHEN THE TRANSCEIVER IS TURNED ON.

EXERCISE EXTREME CAUTION TO AVOID ELECTRIC SHOCK.

6.1 GENERAL

Your TS-830S has been factory aligned and tested to specification before shipment. Under normal circumstances the transceiver will operate in accordance with these operating instructions. All adjustable trimmers and coils in your transceiver were preset at the factory and should only be readjusted by a qualified technician with proper test equipment.

Attempting service or alignment without factory authorization can void the transceivers warranty.

■ CLEANING

The knobs, front panel and cabinet of the TS-830S are likely to become soiled after extended use. The knobs should be removed from the transceiver and cleaned with a neutral soap and warm water. Use a neutral soap (not harsh chemicals) and a damp cloth to clean the cabinet and front panel.

■ FUSE REPLACEMENT

When the fuse blows, there is some cause. Be sure to find the cause before attempting operation. Use a 6 amp fuse for 120VAC operation. Under no circumstances use a higher amperage fuse than specified. Extensive damage can be caused. Also, the warranty will be void if an oversized fuse is used.

■ FAN MOTOR LUBRICATION

Every 8 months dust out the final compartment, and apply a few drops of light machine oil to the front and rear fan motor bearings.

WARNING:

Be certain to disconnect power, and to discharge high voltage before servicing in the final compartment.

6.2 SERVICE POSITION

The TS-830S should be placed on its side, with the final section up, for any alignment or service. This position permits adequate ventilation for the final tubes as well as easy accessibility to the modules. Most of the described adjustments can be made without removing the boards from the transceiver.

6.3 RECEIVER ADJUSTMENTS

■ RIT ZERO (AF-AVR UNIT)

When the RIT circuit is turned on, and the RIT control is set to zero, the receive frequency should be exactly the same as the transmit frequency. If the frequency is not the same, adjust the RIT zero preset control, VR2.

To zero the RIT, turn on the calibrator and tune the VFO for about a 1000 Hz calibrator tone. Turn the RIT control to zero. Turn the RIT switch ON and adjust VR2 for the same 1000 Hz tone. Push the RIT switch ON and OFF to be sure the tones are identical.

■ NOTCH ADJUSTMENT (IF UNIT)

Turn the NOTCH switch OFF and center THE NOTCH control.

Receive a 25 kHz marker signal at 1.9 MHz with a 1.5 kHz beat frequency.

Turn the NOTCH switch ON.

While monitoring AF output through the speaker, adjust L10 and VR1 alternately to minimize this signal.

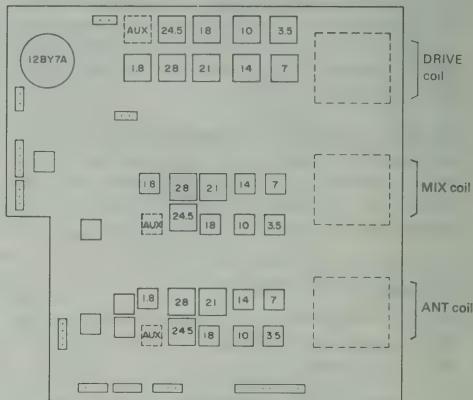


Fig. 6-1

FRONT Panel

BAND Switch	Frequency for adjustments
1.5	1.9 MHz
3.5	3.75
7	7.15
10	10.125
14	14.175
18	18.125
21	21.225
24.5	24.95
28.5	28.8

Table 6-1

■ ADJUSTMENT OF ANT AND MIX COILS (COIL PACK UNIT)

The ANT and MIX coils are included in the coil pack unit. Use the 25 kHz calibrator as a signal. Connect a 50Ω dummy load to terminate the receiver input. Set the DRIVE control to 12 o'clock. Adjust the ANT and MIX coils for maximum S meter deflection, following the frequency table. Start with the 1.8 MHz band and then proceed to other bands. To adjust the 10m band, use only 28.8 MHz in the 28.5 MHz band.

■ ADJUSTMENT OF RECEIVE IF COILS (RF AND IF UNITS)

Receive a marker signal using any frequency. Adjust the DRIVE and the main tuning for maximum S meter deflection. Adjust T2 on the RF unit and L5, L6, L7, L11 and L12 on the IF unit for maximum S meter indication. DO NOT adjust L3, L4, L5 and L9.

■ S METER ADJUSTMENT (IF UNIT)

Disconnect the antenna with the transceiver in receive mode. Zero-point adjustment:

Adjust VR2 for meter pointer zero indication. If a standard SIGNAL GENERATOR (SSG) is available, adjust VR3 so the S-meter indicates "S-9", at 14.175 MHz, 40 dB signal.

6.4 TRANSMITTER ADJUSTMENTS

■ TRANSMITTER NEUTRALIZATION

(See Internal View Bottom)

The TS-830S requires neutralization every time the final tubes are changed.

Tune up the TS-830S into a 50 ohm dummy load at 28.5 MHz for CW operation as described in Section 4. Set the SG switch to OFF and place a sensitive RF milli-voltmeter across the dummy load. Flip the stand-by switch to SEND and adjust TC1 (at the bottom of the final section) for a minimum reading on the voltmeter. After the final section is neutralized, flip the stand-by switch to REC and slide the SG switch ON.

A receiver tuned to 28.5 MHz works very well for neutralizing if an RF voltmeter is not available. Instead of tuning for a minimum voltage, tune for a minimum S-meter reading.

NOTE:

Since the drive tube operates into a fixed load (the finals) it is not always necessary to replace this tube when replacing the finals.

CAUTION:

Neutralization of the final section should be carried out with the chassis shield in place. Dangerous high voltages are present in the final section when the transceiver is turned on. Use an insulated tool to make this adjustment.

■ TRANSMIT DRIVE COIL ADJUSTMENT (RF UNIT)

The drive coils are part of the coil pack unit. Set the SG switch on the rear panel to OFF and center the DRIVE control (12 o'clock). Set the METER switch to ALC and the MODE switch to CW.W, CW.N or TUN.

With the standby switch in the SEND position, adjust the drive coils for maximum ALC deflection for each band using the same frequency and in the same order as for adjustment of ANT and MIX coils.

During adjustment, adjust the CAR control so there is just enough injection to swing the ALC meter.

■ TRANSMIT IF COIL ADJUSTMENT (IF AND RF UNITS)

Using any frequency, place the transceiver in transmit mode in the CW.N, CW.W or TUN position. Adjust L28, 29 on the IF unit and T4 in the RF unit for maximum ALC deflection.

■ CARRIER BALANCE ADJUSTMENT (IF UNIT)

With a 50Ω dummy load connected to the ANT terminal, adjust for maximum output at 14.175 MHz. Reduce mic gain to zero. Set the transceiver in LSB mode and adjust the RF VOLT control on the rear panel for maximum sensitivity. The RF meter will deflect if the carrier is unbalanced. To balance the carrier, alternately adjust trimmer TC2 and trimpot VR4 until the meter indicates minimum. Switch to USB mode and if the pointer deflects, readjust so the pointer deflects equally for both LSB and USB.

■ ADJUSTMENT OF SIDE TONE LEVEL (AF-AVR UNIT)

Adjust VR1 to your preference.

■ ADJUSTMENT OF MONITOR LEVEL (IF UNIT)

Adjust VR8 to your preference.

6.5 TRANSMITTING ON WARC BANDS

As supplied, the TS-830S will receive but not transmit on the 3 new WARC bands. If transmit capability is desired, a minor wiring change is required.

- For all 3 bands: Break the line between the RF unit X44-1360-00, connector #6, Pin #1 (TOF terminal) and AF unit X49-1140-00, connector #6, Pin #4 (TOF terminal).
- Or, for individual Bands: On the RF unit X44-1360-00:

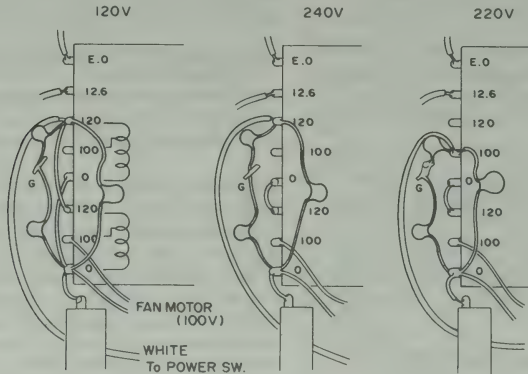
Band	Remove (or Cut) Part
10 MHz	D4
18 MHz	D5
24.5 MHz	D6

6.6 240V AC OPERATION

To operate the TS-830S on 240V AC, the power transformer split primaries must be rewired from parallel to series connection.

1. Unplug the AC power cable.
2. Remove the bottom cover.
3. Remove the jumper wires between the two 0 terminals and two 120 terminals on the bottom of the power transformer.

4. Connect the adjacent 120 and 0 terminals at the middle of the transformer. This will provide 240V AC operation. For 220V AC operation, connect the adjacent 100 to 0 winding.
5. Change the AC fuse from 6A to 4A. Tag the power cord at the back of the radio to indicate that the transformer is strapped for 240V AC, and the power fuse should be 4A, and not 6A.
6. Replace the bottom cover and reconnect power to verify your work.



6.7 ORDERING SPARE PARTS

When ordering replacement or spare parts for your equipment, be sure to specify the following information: Model and serial number of the equipment. Schematic number of the part. Printed circuit board number on which the part is located. Part number and name, if known, and Quantity desired.

NOTE:

A full Service Manual is available as a separate publication.

6.8 SERVICE

Should it ever become necessary to return the equipment for repair, pack in its original boxes and packing, and include a full description of the problems involved. Also include your telephone number. You need not return accessory items unless directly related to the service problem.

You may return your radio for service to the Authorized Kenwood Dealer from whom you purchased it. A copy of the service report will be returned with the unit. Please do

not send sub-assemblies or printed circuit boards. Send the complete unit, in its original boxes and packing. If you want verification of receipt, please supply a self-addressed card (or letter) and you will be informed of the date of receipt and estimated service time.

SERVICE NOTE:

Dear OM, if you desire to correspond on a technical or operational problem, please make your note short, complete, and to the point. And PLEASE make it readable.

Please list: Model and serial number.

The question or problem you are having.

Please give sufficient detail to diagnose; other equipment in the station, meter readings and anything you feel might be useful in attempting diagnosis.

NOTE:

1. Record the date of purchase, serial number and dealer from whom purchased.
2. For your own information, retain a written record of any maintenance performed on the unit.
3. When claiming warranty service, please include a photocopy of the bill of sale, or other proof of purchase showing the date of sale.

SECTION 7. TROUBLESHOOTING

6.1 GENERAL

The problems described in this table are failures caused in

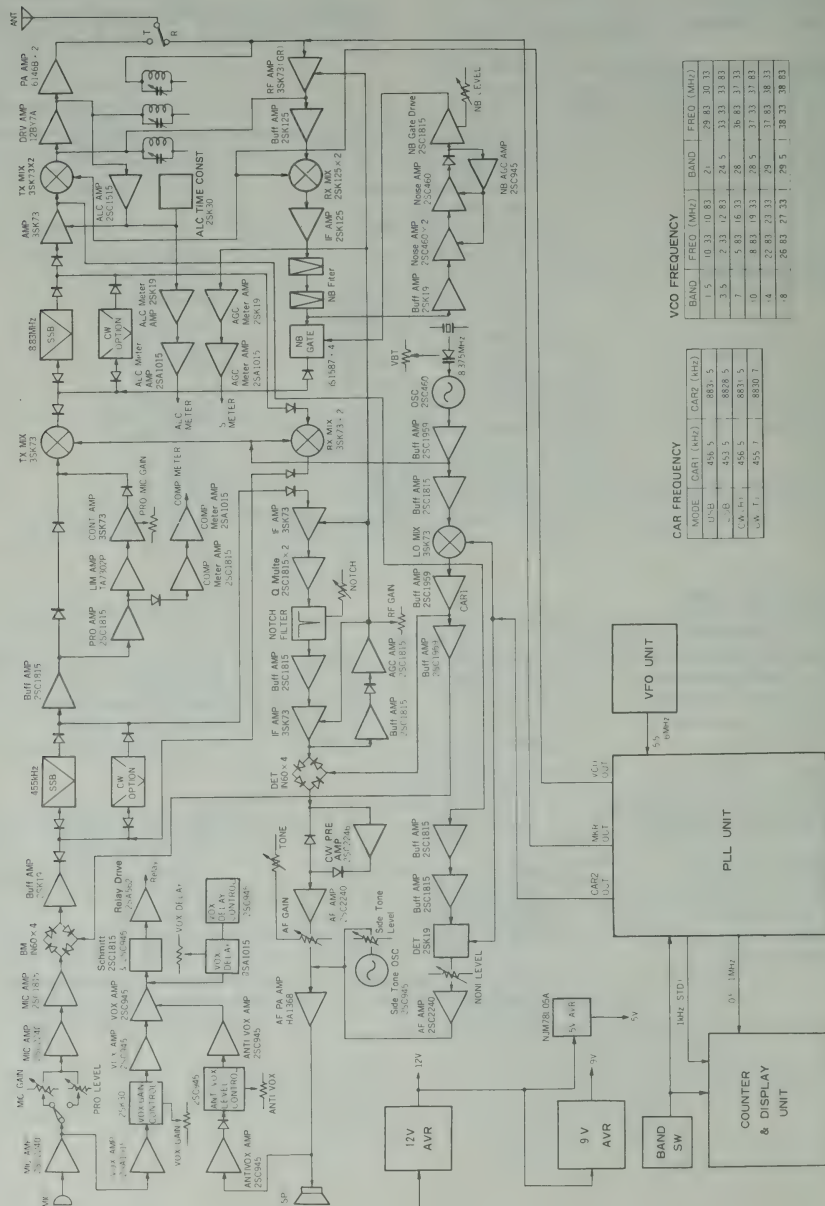
general by improper operation or connection of the transceiver, not by defective components. There is a separate service manual for repair of the TS-830S.

TRANSMITTER SECTION

SYMPTOMS	CAUSE	REMEDY
No output (No plate current)	No voltage on the screen grid of the final tubes.	Turn the SG switch on the rear panel ON.
No output on SSB (No plate current)	1. Open microphone cable or bad microphone. 2. Low microphone gain.	1. Check the microphone. 2. Increase the MIC control.
There is output, but the RF meter shows no output.	RF VOLT control not adjusted correctly.	Adjust control for 2/3 scale reading at full output.
VOX does not operate.	1. VOX GAIN control too low. 2. ANTI VOX control requires adjustment.	1. See section 4.4 2. See section 4.4
VOX trips by speaker output.	ANTI VOX control requires adjustment.	See section 4.4
XIT control inoperative	XIT switch is off.	Push XIT button.
Mic or radio chassis is "hot" during TX.	Excess RF in the shack. No earth ground, poor ground, or antenna is too close to the radio.	See section 2
Poor audio in SSB, TX-feedback	Excess RF in the shack.	See section 2
RF volt reading varies by band.	SWR differences between bands	Retune antenna system.

RECEIVER SECTION

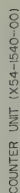
SYMPTOM	CAUSE	REMEDY
Pilot lights do not light and there is no receiver noise when the POWER switch is turned on.	1. Bad power cable or connections. 2. Blown power supply fuse.	1. Check cables and connections. 2. Check for the cause of the blown fuse and replace the fuse.
An antenna is connected but no signals are heard.	1. FIX SW is turned ON. 2. Microphone PTT switch (or stand-by switch) is in the transmit position.	1. Turn the FIX SW off. 2. Release the PTT switch.
An antenna is connected but S-meter deflects without a received signal.	1. RF GAIN control closed. 2. Low AC line voltage.	1. Open RF GAIN control. 2. Use a step-up transformer to raise the line voltage.
SSB signal unintelligible	MODE switch is set to wrong sideband.	Turn MODE switch to the correct sideband.
RIT control inoperative.	RIT switch is off.	Push RIT button.
SSB received signal is extremely high cut or low cut.	1. IF shift is out of adjustment. 2. VBT is out of adjustment. 3. TONE control is out of adjustment.	1. Set to the center (click) position. 2. Set to the NORMAL position. 3. Set to the center position.



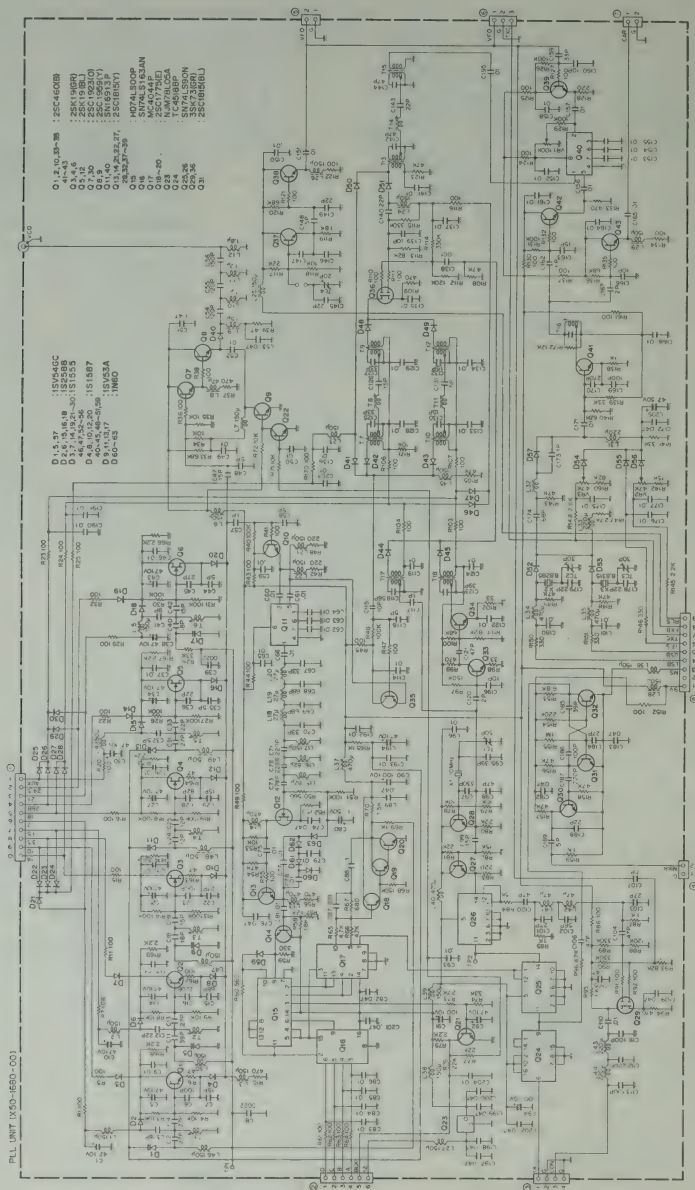
MODE	CAR1 (KHZ)	CAR2 (KHZ)
U ₂ B	456.5	883.5
U ₂ B	453.5	8828.5
CW ₁ H	456.5	8831.5
CW ₁ T	455.7	8830.7

VCO FREQUENCY		
BAND	FREQ (MHz)	FREQ (MHz)
1	5	10.33 10.83
3	5	2.33 12.83
7	5	8.83 16.33
10	8	8.83 19.33
14	22	8.33 27.33
18	26	8.33 37.33

COUNTER UNIT (X45-1540-00)



PLL UNIT (X50-1680-00)



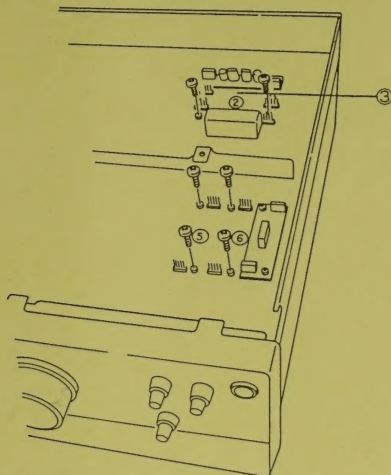
Additional Items to Instruction Manual

Thank you for purchasing this new transceiver.

The following items have been added to the instruction manual :

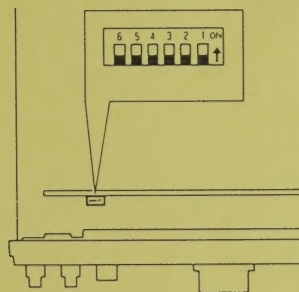
■ YK-88CN-1 or YK-88SN-1 FILTERS INSTALLATION

1. Remove the bottom cover of the transceiver. Refer to Section 6-6-1.
2. Remove the screws from where filters will be installed as shown in the figure.



3. Attach the filter(s) and secure it with the screws you just removed. The filters are not polarized so they may be placed in either direction.

Installation positions	Part No for Filters to be installed	Filter switch
②	YK-88CN-1	Set switch 1 ON.
③	YK-88SN-1	Set switch 3 ON.



4. The desired filters can be arranged matching the number of the filter switch to the number of the installation for each filter.
5. Replace the bottom cover.

Note

Avoid catching your fingers and wiring harness when closing.

Shred®
UPC 10330
No. 153L



